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EDITED BY JACOB VINER AND F. H. KNIGHT, WITH THE CO-OPERATION OF THE OTHER MEMBERS OF THE DEPARTMENT OF ECONOMICS OF THE UNIVERSITY OF CHICAGO

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THE QUANTITY OF CAPITAL AND THE RATE OF INTEREST. I

FRANK H. KNIGHT
The University of Chicago

THE problem of capital as a quantity is obviously another view of the problem of the rate of interest. Difficulty and complexity arise because the relation between capital and interest takes different forms and especially because of the danger of circular reasoning. On the one hand, capital is usually and properly defined as "income" "capitalized" at some "rate of return." But the interest rate is usually thought of as the ratio between a net annual yield and a quantity of capital. On the face of it, this is a vicious circle; interest cannot be a rate of return, i.e., a ratio to a principal, unless the terms of the ratio are definable independently of the rate of return itself, yet in the same units for both numerator and denominator.

This situation led long ago to the development and fairly wide acceptance of a theory of interest which explained the rate in psychological terms not involving the concept of yield ratio or productivity of capital. Capital quantity was held to be simply the sale value, at the present moment, of future income stream—an exchange ratio determined in the market by demand and supply and ultimately by comparisons of givers and takers and the competitive equalization, at the margin, of the appeal or utility of the two magnitudes. It is one main purpose of the present paper

to show (negatively) that, under conditions such as those which obtain in the actual world in which the interest phenomenon occurs, this theory is invalid and (positively) that the interest rate is, in fact, a productivity ratio.

More recently the question of capital quantity has become controversial in a slightly different connection. This current discussion centers around the question of the relation between quantity and yield of capital and period of investment or of production. The question is connected with a phase of the psychological theory, particularly as propagated by the Austrian school. This theory involves the view that capital consists of things, "capital goods," which are periodically worn out and reproduced; while the productivity theorists, notably as represented by J. B. Clark, have held that capital is essentially a continuing fund, persisting through changes in the capital goods in which it is embodied. The general issue in the two controversies is the same, namely, the meaning of a quantity of capital and of the yield of capital, and the connection between the two.

The immediate way out of the difficulty of circularity raised by the view that capital quantity is arrived at by capitalization, which has been argued or implied by productivity theorists (including the present writer), is the notion that the quantity is determined independently of the yield by the cost of production of capital goods. But on the face of it, again, this escape is not entirely successful. For the cost of production of a capital good always includes an element of interest—interest during construction —so that cost itself cannot be accurately determined without treating the interest rate as a known quantity.

This brings us to the more fundamental aspects of the problem and to the essential task of the present essay. It will be shown that the vicious-circle difficulty is spurious. The ultimate meaning of the interest rate does not involve a quantity of capital at all, but only a relation between an instantaneous rate of investment and a resultant instantaneous rate of growth in potential income, i.e., in the return to be had by stopping the investment process at a given point in time. It is true that the accumulation of any finite quantity of capital always includes a certain amount of in-

terest, because the accumulation must extend over some interval of time and the earlier increments must be assumed to earn interest while the later increments are being added. (After a certain point, this interest may be the only addition to the capital in an item, though, of course, only after some investment has been made from without.) But the relations must be defined with reference to conditions at an instant of time. And at an instant the magnitudes involved are not of the nature of capital quantity and income yield but of rates of change in these, while the rate at which income is being invested is identical with the rate of growth of capital. It remains true that a (finite) quantity of capital must be defined in terms of a rate of interest; but because the rate is definable without reference to capital quantity, the vicious circle disappears; and, as the argument will show, the view of interest as the (marginal) productivity of investment is correct when correctly stated. The psychological preference of present to future wealth is merely the reflection of the fact that wealth in hand now will grow into a larger amount of wealth in the future.

CAPITAL IN EVERYDAY USAGE AND IN ECONOMIC SCIENCE

By way of approach to the central problem it will be useful to take some note of the connections or settings in which capital and interest have come into men's thought and discussion. Historically the rate of interest has meant the rate of payment for a loan of money, per dollar per year (or other unit of money and of time), the loan usually running for some specified period, and with the sum lent, the principal, to be returned in a lump sum at the end of the loan period. This monetary notion of interest and of capital largely persists in popular thought and usage.[1] In the business world of today capital is a pecuniary phenomenon in an-

[1] At a later historical stage capital meant primarily a stock of consumption goods (thus in Smith and Ricardo), and this view survives in Böhm-Bawerk and his present-day followers. And, as will be shown, it is correct if, again, it is correctly interpreted. Under ideal conditions any item of capital is equal in magnitude to a quantity of invested consumption income. This is the genetic or backward-looking view of capital as quantity. But a particular item or capital good need not really be equal now to the quantity of the investment historically made in the past in creating it.

other sense, namely the sale value of assets, including pecuniary obligations.

It is, no doubt, impossible to find out the facts as to the actual origin of money-lending, or the conditions attending the phenomenon in the ages in which the practice was growing up and becoming an institution. In particular, it is impossible to answer by historical research the question which would be of especial interest, namely, whether the motive of the borrower was predominantly that of using the proceeds of the loan for productive purposes or for consumption. It is possible to imagine the establishment of a more or less definite rate under either assumption.[2] And if lending were developed and a market established in connection with consumption loans alone, with productive investment not in question in any way, it would be reasonable and, indeed, correct to explain the rate in psychological terms. (Whether or in what sense, if at all, it would be correct to explain it on the basis of a comparison between present and future is a question which must be reserved for later consideration; cf. Part Two of this essay.) No attempt will be made here to work out a theory of interest for a society in which lending takes place purely in connection with a wish on the part of the borrower to consume in excess of production for some immediate future interval and to compensate by consuming less than current production in some more remote future, and, conversely, on the part of the lender, without any increase in the aggregate productive capacity controlled by the two parties together. We shall, however, attempt to demonstrate (also in Part Two) that such lending plays no significant rôle in the determination of the rate of interest under realistic conditions in the modern world.[3]

[2] But there is no basis for guessing as to what the rate would be. It might well fluctuate wildly between positive and negative values with the seasons or other changes.

In theory a rate of interest might become standardized through the purchase and sale of land or of rentals over a specified period of years, a practice which was common in Germany in the Middle Ages when formal payment of interest was prohibited.

[3] For students not too prejudiced against a partly speculative anthropology (as if there could be any other kind!), it could be rather conclusively shown that lending money at interest without prior accumulation of artificial wealth in some form is

In connection with production in the modern world, the essential fact is that the productive system uses a huge stock of artificial resources, built up in the course of history and still in the process of rapid growth (whenever and wherever the system is not disorganized by crisis or other conditions), which resources are in large part privately owned and freely bought and sold and are of familiar, almost infinitely various kinds—including, in the appropriate sense and degree, human capacities. The immediate meaning of productive capital as a quantity is the sale value of productive instruments. But, in the first place, sale value is the only value considered or recognized in economic science; and, in the second place, every item which has a sale value is really a productive instrument. It needs no argument that what is really bought and sold in any sale transaction is some stream of service rendered, or more generally to be rendered, over some period of time. When the *res*, transferred by sale is a capital good in outright ownership and not a mere contract for payment of money, the seller gives up and the purchaser receives whatever capacity to render future service the thing in question posseses or embodies. Thus, all wealth is finally capitalized service, and the capital problem is theoretically identical with the general value problem as it relates to wealth, i.e., apart from the purchase and sale of services as such. In any exchange where a payment is made or a value struck at a point in time, interest is a factor on both the utility and the cost sides of the value-determining relation.

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utterly improbable under primitive conditions and also that, where accumulation is present, the essential phenomenon is that of making capital, as produced and accumulated wealth, productive. But it would be useless to attempt to argue this question in brief compass, especially because of the difficulty in settling upon any definite meaning for the concept of money and a theory of its significance under the conditions of the case. There can be no doubt that, in modern European history itself, the establishment of a fairly effective market for loan funds, with a fairly definite competitive rate of interest, was intimately connected with the productive use of capital. But, again, clear analysis would be difficult because of the predominance of merchandising activities in the market for funds and because of the peculiar rôle played by governmental borrowing in the formative period.

To abstract from the specific effects of particular forms of money or other exchange media and of their changes in value is heroic enough, but this must be taken for granted here, without explicit discussion of the issues raised.

But at this point we must make two fundamental observations of a negative sort. The first is that in a free society the larger part of the productive capacity employed (as matters stand today in a typical Western nation) consists of the services of human beings themselves, who are not bought and sold but only, as it were, leased. Not being bought and sold as things, human beings are not capitalized to any considerable degree or with any considerable accuracy and are not ordinarily thought of as capital or capital goods, although their productive capacity has a theoretically fairly determinate lump-sum value and although they are produced at a more or less calculable cost, i.e., product or productive service valued for other uses. In a slave economy this would all be reversed; slave laborers would be (historically were) capital goods like any others.

The other negative observation is that the purchase and sale of those external things which form the main bulk of the capital or wealth of an economic system, and to which the term "property" is ordinarily restricted, is not an essential feature of the enterprise form of economic organization. It would make no necessary fundamental difference in the course of events if economic life were carried on under a legal system in which no purchase and sale of durable sources of income (or contracts for services) could take place, i.e., if all wealth were rigidly entailed. There are, indeed, difficulties in detail in picturing conditions under such a system, but they do not have to do with essential matters. We have to accustom ourselves, for example, to picturing the complete absence of contracts effectively binding anyone or anything to any mode of action over a period of time. This would undoubtedly be an inconvenience in an enterprise economy, but not a fatal difficulty. The technical processes of production and the distribution of the rôles in production and of the fruits of production could go on exactly as now, with differences only in the legal forms, if all co-operative and organizational relations were a matter of the bargaining situation from moment to moment. This, of course, is now essentially the case with personal services, as time contracts in this connection have little enforceability at law.

In such a system, as goes without saying, wealth and capital,

in the ordinary meaning which they have for our thinking, would not exist. Every agreement involving the payment of interest in society as we know it would be replaced by one involving the payment of rent. Instead of money and the claim to interest and the repayment of money, the property owner, who would take the place of the capitalist, would turn over to a (non-contractual) lessee, in the place of borrower, the use of particular items of real wealth and would receive a right to a specified rental and to the return of the same or identical items on demand. The function of maintaining all capital goods, including any replacement in part or as a whole, would rest with the owner as, of course, would that of creating them in the first place. The point is that the nature of organized economic life consists essentially in the purchase and sale of services which do not exist but "go on" through time. Capital values, as sale values, come into question and into existence more or less accidentally. The vital importance of an understanding of this fact for getting at the roots of our problem is that even in such a system of universal entailment, with all purchase and sale of capital goods absent and exchange dealings restricted to services of persons and things inalienably owned by persons, there would still undoubtedly be capitalization and determination of capital quantity. We have to look beyond the fact of purchase and sale of property for the roots of the capital phenomenon.[4]

[4] The reasons for this fact will be indicated in the course of the argument. We shall not inquire precisely as to what things would be capitalized but assume that the distinction would follow in a general way the line drawn in the world of today. That is, external things would be capitalized, and personal qualities would not. The latter part of the assumption might be argued to raise more serious questions than the first part; there are fairly clear reasons why personal qualities are not capitalized to anything like the same extent as productive capacity in external things, and some of these would still apply in a society of complete entails or a Crusoe economy. But it is not easy to explain the sharp contrast met with in real life—that in the case of external things we take for granted a provision for perpetuity before reckoning any yield, while in the case of personal capacity we just as unthinkingly call all current imputed service value "income." These questions, however, cannot be pursued farther here.

To carry out completely the conception of universal entailment, we should have to think of all rental payments as being made continuously, and think of the arrangement as terminable instantly by either party. Even if exchange transactions were limited to the purchase and sale of services, if these were paid for at intervals,

In the conception of a society with all property entailed, as here used, there is no restriction to stationary conditions. On the contrary, we assume freedom to invest and to disinvest with something like the same complexity of opportunities open as in the world as we know it. But all changes in the character or amount of productive wealth in existence must be determined upon and carried out by the actual owners, both for themselves and, since they are mortal, for their heirs. In short, wealth or property is to be placed in the same position, apart from physical separateness, as that occupied by personal earning capacities in the actual world. And men are assumed to have essentially the same interests, as these affect their economic behavior. Specifically they will be interested not only in maximizing consumable income measured by exchange value, obtained by using resources for that purpose (and in maximizing satisfaction obtained by consuming it), but also in maintaining their economic status and improving it and passing on their status to heirs of whatever sort.

The next step is to note that the situation of the individual in a society of universal entailment is identical for the purposes of economic theory with that of a Crusoe, and to pass on to the conception of a Crusoe economy as such. In an organization with all property entailed the only effect upon an individual which results from the opportunity of exchanging services is to multiply the number of the alternatives open to him for using his productive resources, among which or some selection of which he allocates his services in order to secure the maximum yield. The principles of allocation are in no way affected as compared with the situation of a literal Crusoe, living in complete isolation; and the same applies to the principles of management with reference to the creation and maintenance (or non-maintenance) of productive capacity, which is our problem here. By recourse to the Crusoe situation we may hope to get behind the considerations of money, and even of barter, which cause so much confusion, and get at the realities of the process of capital formation and use.

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an interest rate would be involved in the relation between payments for intervals of different length and between payment in advance and payment at the end of the period covered.

Since we assume our Crusoe to live and work under conditions as like as possible to those of the modern industrial world, including his own interests, he must be supposed to be interested in increasing his income and willing to sacrifice current consumption to that end.[5] He will also be free both to learn new ways of procedure and to change his tastes and, hence, will be interested in moving productive capacity from one mode of use to another. In this connection, too, he will on occasion replace instruments of limited life as they wear out with others specialized to another use, instead of reduplicating them. That is, he will be interested in shifting investment by disinvesting and reinvesting. Moreover, in making any investment or reinvestment Crusoe must be assumed in some cases to know that he will later want to shift the form of the investment, and in other cases to realize that he *may* want to do so, and to act accordingly. That is, he will invest with a view to being able to disinvest to a maximum extent. And this, for purposes of theory (which must deal with limiting cases), means that all his investments will be perfectly liquid.[6]

INVESTMENT AND ITS YIELD: QUANTITATIVE RELATIONS

In an analytic view of the investment process no quantity of capital or of investment is involved at all. What is really invested is always consumption income, which has the dimensions of intensity and time. A quantity of investment is derived by consid-

[5] There is a difficulty here in that if Crusoe knows about how long he may expect to live and does not look ahead to heirs of any sort, he might not maintain this disposition to the end of life. But such possible objections do not affect the usefulness of the hypothesis, and, for that matter, critical examination would show them to be questionable.

[6] This involves abstracting from the factor of contingency; and the difference between anticipating with certainty and as a contingency, though important, must be passed over here. With uncertainty absent an individual will not invest in any project unless the income return plus what is recoverable at the time of disinvestment will together yield the same return as is obtainable in any other project. At the same time, any temporary project will be planned to make the maximum fraction of the invested cost recoverable. This is done by following either of two procedures in relation to each item of equipment. It will either be planned to yield back a maximum fraction of its cost during its service life, or else made highly durable but standardized in design so as to have the maximum value for transfer to other uses when the project in question is liquidated.

ering a certain intensity or time-rate for a certain interval of time. But the mere multiplication of intensity by time (the intensity being assumed uniform) does not yield the correct value for the total quantity. This is one aspect of the essential difficulty which creates our problem, especially because Crusoe, or any other investor, may think of his cost in this oversimple way without, in most cases, introducing any serious error. The essential fact which gives rise to the notion of a rate of return is that, if consumption is sacrificed at some rate over some period of time, the subject may begin at the end of the period to draw a larger consumption income in perpetuity. The concrete nature of the process is that of using the productive capacity which would have yielded consumption income over the interval in question to produce instead a new source of income, for current consumption or for further investment. We assume, of course, that in his given situation he acts in such a way, selects the new source and the method of constructing it in such a way, as to make the new income as large as possible for his investment considered as a given rate over a given interval. The rate of interest may be computed from these data alone, in accord with the simple expression:

$$U_2 = U_1(1+i)^t . \qquad (1)$$

Here U_1 is the intensity magnitude of the income sacrificed (assumed to be uniform); t is the interval of the sacrifice, i.e., the construction period for the new source; U_2 is the intensity magnitude of the new consumption income which begins to flow at the end of t years, consisting of U_1 plus the yield of the new investment, measured after provision for perpetuity at a uniform rate if it is not naturally perpetual and uniform; and i is the rate of interest in the ordinary sense. U_1, U_2, and t are the known or given magnitudes in the expression but may have any value (see below), and i is the unknown. The known magnitudes depend on the conditions under which investment actually takes place, which conditions are assumed to remain unchanged during the course of the investing operation.[7]

[7] It is easy to check the correctness of the equation and at the same time to show that this way of looking at the interest relation is identical with treating it as the

There is still a difficulty to be faced, however. This is the fact that in the equation the new income U_2, which begins to come in at the close of the period of investment, is assumed to be a uniform perpetuity. This, of course, is not in general the immediate result, and this fact itself would force Crusoe to keep capital accounts in order to manage his resources economically. In general the year-to-year yield or rental of a capital good is larger than the true net yield because the instrument will not last always and some deduction must be made each year from its imputed yield in order to provide for its replacement, i.e., for the maintenance of the investment and its yield.

Whether the instrument is actually to be replaced or not (or, if so, with what kind of instrument) has nothing to do with the computation of the rate of return on the investment in it. But the investor must know whether he is receiving more or less than the true net yield (which is the yield on a perpetuity basis) and, if

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yield or productivity of a quantity of investment. We simply take note of the amount of investment actually accumulated during t years if one dollar is invested each year. We assume first that the investment is made in a lump sum of one dollar at the beginning of the year, and that the yield takes the same form. Then the principal which will yield its first instalment of interest at the end of the t-th year is the accumulation over $(t-1)$ years, which is the sum of the series

$$1+(1+i)+(1+i)^2+\cdots+(1+i)^{t-1}=\frac{(1+i)^t-1}{i}.$$

The yield on this amount of principal at rate i is the numerator of the fraction, and the total new consumption income is obtained by adding the original dollar per year, consumption of which is resumed at the end of the period of investment; this cancels the -1, leaving the expression for the annual yield $=(1+i)^t$, as given in Equation (1), taking $U_1=1$.

The equation is unaffected if both consumption-income streams, U_1 and U_2, are taken as continuous instead of as instantaneous payments. The accumulation at the end of t years, when the new continuous flow of income begins, is then

$$\frac{e^{\rho t}-1}{\rho},$$

where ρ is the "force of interest" corresponding to rate of simple annual interest i, being $\rho=\log_e(1+i)$. The annual continuous yield is again the numerator of the fraction, and the argument proceeds as before, $(1+i)^t$ being replaced by $e^{\rho t}$, which is equal to it. (It is assumed that investment entirely ceases at the end of t years. When the investment is made in instalments, there is in effect an overlap of a year between construction period and earning period.)

it is more, must treat the excess as disinvestment of capital. (And if he receives less, he must treat the difference as further investment out of yield.) In fact, the phenomenon of replacement is a special case under a special case. The fundamental fact is that the yield of a capital good is irregular and must be converted into an equivalent uniform rate of flow before it can be measured. It might be—and often is—irregular for other reasons than the necessity of periodic replacement which, in turn, means only irregularity in the maintenance outlay. A uniform maintenance cost would not create any problem, being undistinguishable from any other operating expense.

If any particular investment yields its return at an irregular rate, the actual procedure for securing regularity is alternately to invest and disinvest in some other field, investing whenever the primary investment is yielding more than the equivalent uniform rate and disinvesting when it yields less (by more than the current yield on the auxiliary investment). That is, in effect, capital is transferred back and forth between the primary and the auxiliary fields of use. The necessity of this transfer would force the investor to keep capital accounts, i.e., to know the amount of the investment as well as to compare receipts. The computation is fairly simple if it is possible to invest and disinvest at will at the same rate of yield and at any desired "speed"[8] in the auxiliary field. The only simple way in practice for comparing two irregular or time-limited income streams is to find the present worth, the capitalized value, of both; this is, in effect, the mathematical way of converting each into a uniform perpetuity.

There is, however, another and even more fundamental reason for capitalization, i.e., another fact which makes it necessary to know the quantity of capital in order to compare fields or modes of investment and so to secure maximum economy. This is the fact that different investment operations involve different intervals or proceed at different rates, or both. Even if all yields im-

[8] The ambiguity of the word "rate" is most unfortunate. In expressions such as the "rate of interest" the word is inaccurately used as it combines a time-rate of flow (the correct meaning) with a ratio of this flow to a principal. And in addition there is really involved an instantaneous rate (ratio) of growth with reference to a continuously changing base.

mediately took the form of a uniform perpetual rate of flow (except, perhaps, where otherwise explicitly planned), it would be necessary to "accumulate" the investment during the period of construction, as shown in the explanation of Equation (1). It is only by computing the invested capital, including interest during construction, continuously compounded, and equating the result with the present worth of the anticipated yield, for any two investments, that their relative desirability can be determined and the aim of economy realized. Both sides of the equation express the quantity of capital and involve the rate of interest. The equation is to be solved for the rate, and the investment which yields the highest rate is, of course, to be chosen. Thus in most real cases the computation necessary for the perfectly rational directing of investment is far more complex than we have indicated.[9]

The root of the difficulty as regards capital, viewed as the cost of an income-yielding source, is that to make any finite investment necessarily requires time, no matter at what speed it is made. But the instant any investment whatever is made, it must be assumed to begin to yield a return which, since it is not instantly consumed, must be added to the investment itself. That is, if an

[9] The equation may be given in various forms. The following three are for the cases in which the anticipated yield is (A) naturally a perpetuity, (B) time-limited and capitalized as it stands, and (C) time-limited but converted into a perpetuity by deduction of appropriate contributions to a sinking-fund for replacing the source (by a single payment at the end of its life). In all cases the rates of flow—both of income into investment and of yield out of it—are assumed to be uniform. When they are not uniform, the equations will be built around integrals between limits of the expression $f(t)e^{pt}dt$.

Let the cost of a capital good be S dollars per year for c years and its yield R dollars per year for L years. (In (A), $L=\infty$.) All payments are to be in annual sums at the beginning of the year, interest compounded annually. Let $(1+i)=A$.

$$\frac{S(A^c-1)}{i}=\frac{R}{i} \quad \text{or} \quad S(A^c-1)=R \tag{A}$$

$$\frac{S(A^c-1)}{i}=\frac{R(A^L-1)}{iA^L} \quad \text{or} \quad SA^L(A^c-1)=R(A^L-1) \tag{B}$$

$$i=\left\{R-\left[\frac{S(A^c-1)}{i}\cdot\frac{i}{A^L-1}\right]\right\}\div\frac{S(A^c-1)}{i}, \tag{C}$$

which is readily reduced to the same form as (B).

investor begins to sacrifice (invest) consumption income at a rate U_1 (using the same symbol as before), he is after the first instant really investing it at a higher rate of speed, because he could have had some consumption income by stopping the investment process at the first instant. And the longer the process continues, the greater becomes the rate at which potential consumption is given up. Thus, to find the total amount of investment made in any new source of income, we have to add two elements. One is the investment made from without, as it were—the value of the sacrificed income of the services of previously existing productive agencies used in creating or constructing the new source. The other element is usually called "interest during construction" and includes not only interest on each infinitesimal investment from without from the instant it is made until the investment is completed, but also interest on each infinitesimal increment of this interest from the instant it is earned until the same point.[10] In real terms, this interest, and interest on interest, represent the specific product during each instant of the uncompleted capital good as it exists at the beginning of the instant in question. (Of course an instant has no duration; it is the mathematical limit of a process of taking shorter and shorter intervals to infinity.)

However, as indicated at the outset, it is not necessary to take account of any lapse of time in order to secure the theoretical data for determining the interest rate. This can be shown by differentiating Equation (1) with respect to time. The result is

$$\frac{dU_2}{dt} = U_1(1+i)^t \log_e (1+i) .$$

(It is to be noted that U_1 is a constant in the equation, i.e., is independent of t.) The new equation gives the rate of change in the individual's income, at any moment, t units of time after the beginning of the investment operation. But obviously any

[10] The moment of completion is most realistically taken as the point in time at which outlays cease to exceed return and return begins to exceed outlay, always including in the latter interest on interest as well as interest on expenditure from the outside. The ordinary rate of simple annual interest, i, is, in fact, the result of continually compounding interest during the year at a somewhat smaller rate, $\rho = \log_e (1+i)$.

moment can itself be taken as the beginning, so that t may be made equal to zero. Then, since $\log_e(1+i)=\rho$, the right-hand side of the equation reduces to $U_1\rho$. That is, the instantaneous rate of interest is the rate of growth in income resulting from investment, divided by the rate of investment.

The essential facts of the investment process in a Crusoe economy with uncertainty absent, may be recapitulated as follows. First, investment must take place at some time-rate or speed (really an intensity) over some finite period of time. But each increment of investment must yield its return at the same rate (in the sense of "ratio"), either in consumed service or as an addition to the investment, and *for as long as it remains invested.* It must either yield in perpetuity a return for consumption, or further investment, at this rate, or yield up the original investment. Because the process of investment must be spread over time and because, in general, there is more or less disinvestment in connection with the direct yield of any particular capital good, it is necessary to recognize the separate period of investment, from zero to infinity, of each infinitesimal increment of capital invested in any source or capital good. Only in this way can different investments be made at the same rate and the maximum yield obtained on the whole capital, which is possible under the given economic conditions.

This view of the matter yields a computation form different from that of Equation (1) but does not invalidate the latter or present a different theory. Any one of the equations (1), (A), (B), or (C) expresses the fact that sacrificed income invested yields a return at the annual rate of i dollars per year or the instantaneously compounded rate of ρ dollars per year, which return is itself invested at the same rate of yield whenever it is not instantly drawn out and consumed or reinvested elsewhere. While an investment is being built up, the yield during each infinitesimal interval of time of all the investment previously made is added to principal, along with whatever new investment is added from without during the interval. Summation gives the total invested. Treating this as the present worth of the future yield merely expresses the fact that each infinitesimal increment of capital

will continue to yield at the same rate as long as it remains invested, i.e., until it appears in consumable form and is consumed or reinvested under some other account. This is the ordinary view of interest as the ratio between the yield of a capital sum and the capital itself, maintenance of principal being assumed. The rate expresses the marginal productivity of capital in that the investment considered is assumed to represent a negligible addition to the capital of an economic system. The time relations of this fact will be emphasized as we proceed.

The argument as given develops the theory of capital and interest with reference (*a*) to ideal conditions at a given moment in the life of any capitalistic economy (Crusoe or other), and (*b*) to a single increment of investment considered as negligible in comparison with the total amount of capital already invested in the system. By ideal conditions we mean especially that the investor of the small increment of capital under consideration knows everything about the rest of the economy that would in any way affect his conduct in planning this particular investment. This means that he knows the conditions affecting the investment either for all future time or for whatever interval he plans to maintain the investment, i.e., until it is entirely disinvested for consumption or reinvestment under another account.[11]

The theory assumes, as a matter of course, that the investor acts rationally, in the sense of economically, meaning in such a way as to get the maximum yield on his investment, which is mathematically identical with saying that the present worth of the investment is maximized at every moment in the course of the action. The theory has to do only with the relation between income and capital value and assumes that yield itself is a known magnitude. As a matter of fact, the making of an increment of investment would change the composition of real income, and there

[11] It should be understood that it is impossible for more than one individual in the same human group at the same time to take the rest of the world as given or predictable and act upon his knowledge, unless all those who do so act in complete and express collusion. This is a general limitation on the theory of intelligent behavior as applied to group life. It is a further and much more sweeping limitation, in addition to the impossibility of complete and perfect knowledge of the course of natural events.

is no objective common denominator for measuring one income in terms of another of different composition. (The difficulty is especially serious with reference to a Crusoe economy.) Yet incomes are comparable with a fairly narrow margin of error; otherwise no behavior which affects any change in conditions could be intelligent at all.

In assuming that the new increment of investment is negligible in size we assume that its addition to the total does not affect the rate of interest. It does not matter how long the construction period is, as the lapse of time is taken into account in the formulas. The moment to which the rate applies refers, then, to any point in time during the interval in which investment is made.

The argument also abstracts from the effect of any anticipated future change in the rate of interest during the life of the investment, which may then be of any duration up to infinity. The effects even of a foreseen change in the rate of interest (the rate obtainable on a small increment of new investment) as well as the bearings of possible changes not accurately foreseeable (the effects of uncertainty) present distinct problems which must be reserved for separate consideration.

This notion of capital quantity as capitalized future yield applies not only to the particular increment of investment being added to a total during any short interval of time, but to all the other items of capital in the system. Of the capital invested up to any given moment, every unit is marginal. Every one is valued by capitalizing its actual yield at the rate yielded by any final infinitesimal increment, which is equal to the yield on the next infinitesimal increment of investment to be effected. The capital represented by any source of yield is the minimum investment necessary to produce the same yield under the conditions obtaining in the system at the given time. The form which the next increment of investment would take is not in question—specifically the degree in which the new capital good added would resemble any already in existence. The total capital in a system, then, means simply the aggregate of the quantities obtained by capitalizing the future earnings of each item at the rate which is effective at the margin. The next step in the argument is to bring out

the relation between the view of capital here presented and the historically accepted theories, with especial reference to the conception of capital as a quantity of investment.

HISTORICAL CONCEPTIONS OF CAPITAL

Ricardo and his successors of the older classical tradition solved the problem of capital quantity by treating it simply as a quantity of product in the particular situation of agriculture. Agricultural production was viewed as a double or overlapping cycle; each year a quantity of product from the preceding year's operations was thought to be reproduced and advanced to labor as subsistence, and in the cruder statements, running in terms of "wages fund" doctrine, the quantity of capital seems to be the entire annual product. But rent, of course, in the cases where rent was paid, had to be deducted, and profit as well. In the only explanation we really get of the division between labor and capital the fund destined to the support of labor is simply the customary living requirement of whatever laborers the employer arbitrarily decides to employ "productively" or "unproductively." The rate of return from the capital (per cent per annum) is then the quotient obtained by dividing the residuum left after the deduction of wages from the annual product (less rent) by the capital itself, the wages advanced.[12]

$\frac{P}{W} - 1$

[12] The classical writings, of course, contain much discussion of other forms of capital than subsistence annually advanced to laborers in agriculture, but they develop no theory of interest in any other connection. In the discussion of value in relation to capital cost as an element in value Ricardo, in particular, makes it clear that he assumes that capital in other uses yields the same rate of return as in agriculture, and that the quantity (value) of fixed capital consists of its labor cost increased by interest compounded annually during its period of construction. The essential things that are lacking in the classical treatment of profit are: first, any discussion of the allocation of capital independently of labor, especially between agricultural and other uses; and, second and more fundamentally, any notion of diminishing returns in the yield of capital as distinct from labor in any mode of use. Ricardo gives a fair account of the working of diminishing returns from labor-and-capital applied to land; but the theory of capital, in the only connection in which the classical writers have any theory, i.e., wages advanced to labor in agriculture, not only overlooks but actually excludes the notion of diminishing effectiveness of increasing amounts of capital used to employ a given number of laborers. The subsistence theory of wages

In his discussions of the use of capital in industry Ricardo uses annual compounding of interest, and it is clear that he thought of interest within the year as negligible. The error, of course, is not large.[13] Except for this detail, the notion of investment as a quantity of produce, meaning consumption income, is correct. The quantity of any investment may be regarded as a quantity of sacrificed consumption, if we cut up the interval over which the investment is made into infinitesimal increments of time and consider the quantity of consumption sacrificed during each short interval to include not only the equivalent of the productive capacity expended on the growing capital good from without, but in addition, an allowance for the marginal productivity of the investment made up to the beginning of that time interval. This additional quantity may be thought of either as the rent on the unfinished capital good, as it stands at the moment, or as interest on the investment already made in it.[14] If all these expenditures and virtual expenditures are aggregated over the entire period of

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involves fixed proportions between capital and labor, and this is the common assumption in the classical writings.

Naturally, I do not mean to imply that all the classical economists, or any of them, were ignorant of any of the general facts of economic life and organization of which no fairly intelligent and observant person could be ignorant. One can usually, if not always, find in sections discussing other problems statements in which a writer recognizes familiar facts which do not fit his general theories. E.g., in discussing gross and net income Ricardo observes that "in advanced countries" capital seeks trades in which "profits are in proportion to the capital, and not in proportion to the quantity of labor employed" (*Political Economy* [ed. Gonner], p. 338). Professor Viner has recently called my attention to this passage, which I had never noticed in this connection. The fact that Ricardo's conception of the gross and net income of a nation is fantastic does not concern us here. Special mention might be made of the discussions of machinery which occur in various connections in the classical writings; also of the fact that the economic theory contained by implication in the treatments of foreign trade is often better than that given in the theoretical chapters themselves. Any statement pointing out an oversight or an omission on the part of practically any economic writer, from Xenophon and Aristotle down, must be interpreted in the light of such qualifications as these, if they are qualifications.

[13] It is a more serious error of fact to consider the cycle of operations in agriculture as complete and repetitive on an annual basis.

[14] All interest is, of course, a rent on some capital good, intangibles being equities; the notion of rent and interest as different shares is an absurdity under modern conditions.

growth of the investment, i.e., the construction period for the capital good, the sum will be the quantity of capital which it represents. And, if the investment is rationally made, this quantity will be equal to the present worth of the income stream to be derived from the use of the capital good.

Between Ricardo and the "revolution" represented by the work of the subjective-value theorists of the 1870's, the main advance in the theory of capital was the introduction of the notion of abstinence by Senior.[15] But, in fact, the notion of abstinence was used merely to give for the capital element in the cost of production an interpretation in terms of "pain," i.e., to make this element in cost homogeneous with labor. Böhm-Bawerk notwithstanding, Senior made no attempt to explain the rate of return on capital in terms of abstinence as a variable or to develop any notion of the quantity or intensity of abstinence; his theory of profit was Ricardian, like that of Mill after him.[16]

The next real development, then, was the working out of a production-period theory of capital by Jevons and later by Böhm-Bawerk (no doubt independently as he said) in a form less precise and definite but better suited for popularization. Böhm-Bawerk's period of production has different meanings in different contexts. In the view that seems most fundamental, what he did was first to apply expressly to auxiliary capital goods (i.e., capital in other forms than food) the old notion of a subsistence fund maintaining labor while it produces the capital goods in question; he then added the idea that extending the length of the production cycle—by extending the production period or the service life of capital goods, or both (a point on which there is much confusion)—is the general meaning of employing additional capital. But, of course, we must include also the use of labor to produce new capital goods not previously existing, which is also regarded as "lengthening the production process," whatever may be the construction period and/or service life of the new instrument. Böhm-

[15] The abortive attempt in the direction of a productivity theory by Longfield need not be considered here.

[16] The question of what the notion of abstinence ought to mean for capital theory, in connection with the problem of supply, will be taken up in Part Two.

Bawerk seems to have thought, and his present-day followers seem to contend, that the increase in some "average" length of the production cycle consequent upon any combination of such operations measures the quantity of capital added to the system by the operations. Their theory is thus essentially the same as that of Ricardo, who recognized that the labor theory of value must be qualified to allow for the effect of differences in the time required to bring to market the products of equal quantities of labor.[17]

The essential fallacy of the Ricardo–Jevons–Böhm-Bawerk theory (developed and much refined by Wicksell) is the notion that capital is produced by labor, or by "other factors." As far as its "merits" are concerned, an idea so palpably in contradiction with fact should not require notice; but historically it is, of course, vitally important. It is obviously a phase of the general heresy of the classical school to the effect that labor alone is productive. The notion that quantity of capital measures or in any way corresponds to a production period—an interval separating the date of application of other factors to capital from the date of enjoyment of the product—naturally goes the way of the parent heresy. Only if we consider a single increment of capital, added over some interval of time to an existing organization (and, of course, produced by the co-operation, more or less immediate, of all the productive agencies existing at the time), is it possible to give meaning to the theory. We must further assume that the new capital good in question is one of limited life and is, in fact, simply to be

[17] See Victor Edelberg, "The Ricardian Theory of Profits," *Economica*, February, 1933, pp. 51–74.

The significance of Böhm-Bawerk's confused exposition may be indicated as follows: His third ground for the preference of present to future goods is simply a confused recognition that capital is productive, that a particular capital instrument will ultimately yield more value than it costs—and this in a definite relation to its life. His second ground, the psychological underestimation of the future, represents an attempt to explain the quantitative relation between the present worth and the total yield of capital goods from the side of demand in terms of a utility comparison. As already noted, the real significance of such a comparison is on the supply side. In order to give it meaning the value productivity of capital must be recognized as a decreasing function of the supply, and it must be assumed that the supply is controlled *at any moment* by a psychological comparison between present and future satisfactions (see Part Two of this paper). The first ground, differences in want and provision for want, might work in one direction as well as the other.

alternately produced, worn out, and reproduced in an indefinite sequence, while no other change takes place in the system. A periodicity theory is then applicable to this single item. The unreality of such assumptions in speculating about a continuing, or especially a growing, economic system in the real world needs no elaboration. As soon as such an incremental new item is incorporated in an organization of co-operating agencies, the theory loses its validity.[18]

[18] If capital accumulation were to go forward without other changes, the average service life and construction period of capital goods would presumably increase somewhat. Increasing the construction period of capital goods is one way of investing capital, and may be used to reduce other elements in cost; increasing the service life of capital goods is one way of increasing their yield, since it reduces the maintenance charge; but in both cases, it is one way among a practically infinite number. Also, the theoretical turnover period for capital, computed in any of several different ways (total capital value divided by replacement expenditure, total non-capital expenditure, or total social income), should tend to increase in consequence of the working of the principle of diminishing returns from investment under given conditions. None of these is in any real sense a production period, as none indicates anything as to actual disinvestment of capital or its disinvestability. The period theory really fits only the old conception of capital as a sack of provisions which is alternately filled and used up in a real chronological cycle. Total capital, it must be remembered, is simply whatever is capitalized; the distinction between capital and other agents is largely accidental or arbitrary. And capital cannot continue to accumulate under given conditions (see Part Two).

The treatment of capital by Wicksell has recently been so much cited by "neo-Austrians" as authoritative support for their position on capital theory that some comment upon it seems to be called for. Wicksell's argument runs altogether in terms of the assumption that capital goods are produced by labor (analysis of Akerman's problem) or by labor and land-service (*Lectures*, pp. 146, 150, and Part II, chap. i, *passim;* but cf. p. 149, where the cost of production of capital goods expressly includes capital and interest!). This is all that it should be necessary to say about it for the purposes of the present argument. That able economists make such statements must be explained psychologically; there is no explanation in fact and logic. It is certainly self-evident that only the first infinitesimal increment of capital at the beginning of economic history could possibly be the product of "other factors." From that moment forward, capital co-operates in the production of further capital on the same terms as do other factors—if and in so far as there are other factors essentially different in character. Apart from differences in cost or speed of change, it is fallacious to speak of primary or ultimate factors of production. The resources as they exist at any moment are alike ultimate for economic reasoning, which properly looks to the future, treating bygones as forever bygones. Wicksell also assumes that increasing the durability of capital instruments is the only way in which additional capital is employed—though he formally recognizes the falsity of this assumption (in the very last paragraph of the analysis of Akerman's problem).

Even in the imaginary case considered, it is misleading to say that the creation of an additional "single investment," in a system otherwise unchanged, represents the indirect use of the previously existing productive capacity. This is legitimate only if the new investment is for some expressly temporary purpose such as storing up supplies for a vacation, and is accordingly planned for disinvestment within a relatively short time. In so far as it is carried out as an addition to the permanent capital or "earning assets" of the system, it is impossible to keep books or manage resources in these terms. With respect to any accounting period in which new capital is created, the result must be treated as production of income (increase in assets) and in subsequent periods its yield must be imputed to this capital; it cannot be imputed back to the productive agencies which created the new capital (assets). It is true that business is sometimes concerned with such temporary projects, planned to be liquidated and the gain or loss carried to some other account. It is also true that planning for a high degree of fluidity represents in some respects an intermediate case.

It is also misleading to speak of any determinate lag between production and consumption. This again is not quite meaningless in connection with production of specific "consumption goods" such as food or fuel; but it is vague at best, and even these properly come under the conception either of perpetual maintenance or of growth or shrinkage when either in fact occurs. And the lag is not only quantitatively vague but tends to lose meaning where growth or contraction in one form of capital is associated with considerable reorganization of the rest of the system. For a presumptively permanent addition to assets the lag is infinite, and the "sacrifice" involved in creating a new asset is "abstinence," *not* "waiting." Finally, such a notion is applicable at all only to a unit of negligible size at the margin. It has no meaning for the capital of a society or any considerable fraction of it. It is palpably absurd to ask how long the United States, for example, could continue to consume its present income if capital maintenance were suspended (it could not be enjoyed for a week or hardly for a day without considerable change in form), or how long it would

take to replace the capital if it were destroyed. Even with respect to typical items, taking production in the physical sense, it is really absurd to ask when the production of a loaf of bread began or when the consumption of the product of a hammer or shovel will end. And taking production in the value sense, the result is instantaneous, whether in the form of a service (instantly consumed) or in that of a net addition to assets. (There are no other forms of value production; all replacement is a part of the current production of services.)

But, in the second place, there is a still deeper and if possible more enormous fallacy in the classical-Böhm-Bawerk view of capital. That is the notion that it is the essential nature and function of capital (goods) to be consumed. The contrary is rather the case, and the entire conception of the meaning of wealth and of production and consumption, traditional in economic theory, is wrong. Wealth, or capital, is as permanent as capitalistic society itself. It can properly be said to be produced only when a new increment is added to the total in a system as a whole (a *Wirtschaft*, however bounded); and, correspondingly, wealth is consumed only when its consumption represents a subtraction from a total, i.e., when it is consumed without replacement, anywhere in the system, in any concrete form. In a stationary economy what is produced and consumed is *services*, and all production of things constitutes *replacement* and is a part of the production of the services *simultaneously* consumed. This is as true of bread or dynamite as it is of items with the longest turnover. Replacement of concrete items of wealth as they wear out is a technical detail in the *maintenance* of the productive equipment of the system.[19]

[19] This is true in theory whether the replacement takes the same physical form as the item replaced or any other form whatever. The notion of an economy stationary in the sense that productive equipment is changed in form but quantitatively maintained without increase gives rise, indeed, to difficulties. But we undoubtedly have to recognize the conceptual validity of the idea, even if we never could precisely describe or identify the reality. There unquestionably is a difference between changing the physical character of particular productive agents in connection with moving capital from one field or mode of use to another, and increasing (or decreasing) total productive capacity. This question would lead out into the larger issue as to what can be taken as given in connection with various changes in an economic system or,

The confusion in the theory of capital arises largely in connection with the notion of the maintenance of investment or the fact that the yield of any investment must be treated as essentially a perpetuity, in relation to the fact that investments take the form of concrete things which are of limited life—typically and as regards the bulk of their value. As already emphasized, there is no implication that any particular increment of investment, made by any individual over any particular interval of time, is actually to be maintained in perpetuity. Though, as will be shown in a moment, the facts are in harmony with such a view, it is not essential for the theory. All that is necessary is that the individual owner of any income-yielding capital good or quantity of capital shall distinguish between consuming its yield and consuming the capital itself. Still less is there any implication that the maintenance of capital is "automatic," an objection arbitrarily insisted upon by some critics.

It seems important, however, to emphasize the fact that—the Crusoe hypothesis on one side—capitalistic civilization, in the only historical example we have any possibility of studying or any occasion to theorize about, does maintain its capital and increase it fairly rapidly. The only exceptions have to do with times and places in which economic relations are demoralized by crisis conditions, and in which there is no approximately free market for loans or for capital goods. The problem of an interest theory to fit a capitalistically decadent system, in which such a free market would continue to exist, is a pure speculation and presents serious difficulties which will not be gone into here. It is highly questionable whether an enterprise economy could actually function in a fairly orderly way under the condition of progressive disinvestment if this is rapid or long continued. (Decline in per capita wealth is less improbable and of course may occur in a limited area.) Certainly, what we call the "economic interest," in the context of modern civilization, includes as an apparently essential factor the interest in getting ahead, both for the individual during

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more particularly, what can be treated as part of the frame of reference within which any change takes place. Certainly there is no value magnitude which will remain entirely unaffected through any change whatever.

his own life and for his successors or heirs of some kind. In the aggregate people are as much interested in this getting ahead, which does not look forward to any cessation of getting ahead, as they are in maximizing their consumption in relation to the economic resources momentarily available. They save in order to save more in the future as well as to consume more. The question of what kind of a world it might be if this fact were changed is a type of speculation into which the present writer does not care to enter. It is clear that no substantial amount of capital could ever be accumulated if this were not the case, i.e., if saving were made only with a view to later consumption with its increase.

It is true that the typical investor, in investing, considers the possibility, which in some cases is a certainty, that he may subsequently wish to disinvest his capital in the real sense of "eating it up." But in so far as operations are carried on in an effective capital market (and under certain conditions to be noted below, which are generally realized), these facts will not affect the character of the investment. In a society in which total capital is growing, or even being maintained, disinvestment by an individual merely offsets an equivalent amount of investment by some other individual. And in so far as the total capital of the system is kept invested in the most remunerative way, transfer of the ownership (in the form of concrete things or of abstract capital) from one individual to another will affect the detailed course of economic life only in so far as the new owner's demand for consumption services may be different from that of the previous owner.

The fact that the investor typically plans on the basis of maintaining the investment in perpetuity does not by any means imply that he consciously looks forward to infinity or over any particular distance in time. As long as he plans to be a little better off, or at least as well off, in the immediate future, however narrowly defined, as he is at the moment, and does not explicitly plan to the contrary with regard to the more remote future, the effect is the same, even in a Crusoe economy, as if he did literally look ahead to infinity. And, as just pointed out, the fact that an investment may be planned for temporary duration and for disinvestment at a foreseen time does not change the fact that on the whole capital

will be managed as if explicitly planned for eternity, if it is managed intelligently in a society which is actually, and is known to be, progressive or stationary.[20]

Much of the difficulty and confusion in capital theory arise from the fact that investments are made in a world of economic uncertainty and that their character is largely influenced by the recognized possibility that the investor may want to change the form of the investment to meet changed conditions in the capital market. In consequence of this fact, two different but overlapping considerations—namely, the mobility of capital and its convertibility into money through non-maintenance—come to influence the character of investments to an important degree. But these considerations do not call for any essential modification of the basic general theory.[21]

The importance even of provision for possible real disinvestment, i.e., actual consumption of capital, tends to be greatly exaggerated, as does the possibility itself. The great bulk of capital goods are used to an important extent in complementary relations with other things, both simultaneously existing and in time sequence. Obviously, the investment in one part of a machine cannot, in general, be withdrawn and spent unless this is done for the machine as a whole; the machine is more or less organically related to other productive agencies in a plant, an industry, and so on without any definite final limit. Of course, many forms of investment are relatively flexible at the margin, but, as the world actually stands, the amount of capital which could be disinvested without entailing extensive reorganization of production is quite limited. The bulk of investment has not been planned with a view to disinvestment; with total capital growing rapidly, fluidity is obtained largely without actual disinvestment. The loss, of course, would be greater the more rapidly disinvestment took place, but the amount ultimately recoverable would certainly be a fraction of actual going value. And the very notion of an orderly, extensive, general disinvestment is fantastic. Even the impor-

[20] Cf. above, p. 456, n. 19.

[21] The actual procedure is, of course, to plan for fluidity, or for being in a position to achieve fluidity in a limited time, beyond an interval over which earnings are predicted with a fair degree of confidence.

tance of individual freedom to disinvest needs to be estimated with care. In particular, the scramble to "liquidate," in the sense of raising money, at a time of crisis must not be confused with a desire to liquidate in the real sense of converting capital into income for consumption.

In short, from the standpoint of the general theory of capital we must maintain the familiar view, advocated in abstract form especially by J. B. Clark, that the capital of an economic society or system is a continuous organic whole, a fund measured in value units, though at any moment it is largely (not entirely) embodied in things of a sort which more or less regularly wear out, are used up or become obsolete, and are replaced by other items of the same or different description. This view is in harmony with all ordinary thinking and procedure in connection with capital quantity. The quantity of capital represented by any existing thing is simply its value, the capitalization of its yield; under ideal stationary conditions this would be identical with its historical cost in sacrificed consumption, figured in the inclusive sense previously explained. Periodic replacement in one form or another, if involved to any degree (it is almost never complete), is essentially a detail in the administration of the capital, specifically in maintenance.

Under anything like the conditions of real life, but apart from the influence of uncertainty, the durability of the capital goods constructed is a matter of complete indifference to the investor, the rate of return after provision for perpetual maintenance being the same. But it may be noted that this might not be the case in a society which was rapidly decadent and recognized to be so. The forms of investment yielding the highest net return might be so predominantly of such long life as not to admit of disinvestment in the system as a whole at the rate at which the membership of the group, in the aggregate, were disposed to disinvest. In real life, where society is universally assumed to be progressive, the only circumstance leading to a possible preference for investments of rapid turnover is the factor of uncertainty, with the consequent desire for fluidity in the event of any change, which would make it desirable to convert the investment to some other form. This desire for fluidity is, of course, tremendously important, but

nothing need be said about it here beyond the recognition of that fact.[22]

Similarly, the construction period for the capital good in which a new increment of investment is embodied is ordinarily a matter of indifference, ultimate net yield being the same. But we can again imagine conditions under which this assumption would not be valid, either for a Crusoe or for a member of an organized economic group. The investments yielding the highest net rate might be overwhelmingly such as involve a very long construction period before beginning to yield any return at all, in consumable form, or such a fraction of their return as would meet the needs of investors wishing some cash return instead of further increase in wealth. It seems safe to assert, however, that this is not the case in reality, that the only consideration leading to a discrimination against extremely long construction periods, such as the planting of trees of very slow growth, is again the factor of uncertainty.[23] In fact, as far as this matter of possible sacrifice of yield for the sake of fluidity is concerned, the construction period and service life may be considered together as a turnover period, though the distribution of investment and disinvestment within the total period is not a matter of indifference.[24]

[22] With reference to a Crusoe economy, actual desire for disinvestment with the approach of the end of his life would be an important consideration if Crusoe really looked forward to the complete and final termination of his economy with his own demise and behaved rationally. What Crusoe would look forward to, and how he would behave, would be subjects for a perfectly otiose inquiry. But it may be added that Crusoe would presumably take account of uncertainty in much the same way as the investor in an organized economy.

[23] It is likely that in an enterprising community uncertainty actually leads to excessive investment in fields where it is high instead of keeping capital out of such fields. Against the desire to know what one is doing and the supposed repugnance for taking risks, we must balance the gambling instinct. The preponderance of evidence seems to show that the latter is actually the stronger, though there is no unambiguous scale of degrees of uncertainty.

[24] It should hardly be necessary to point out that the differences between interest rates for loans of long and short periods (and the presumptive discrimination between investments of long- and short-period turnover) familiar in the market are, in fact, due in the main to uncertainty and to special conditions affecting the market estimate of prospects. Such differences become pronounced chiefly in times of crisis or depression, less so in periods of expected change in the value of money where crisis and depression are not involved. The theoretical allowance to be made in pecuniary contracts in consequence of anticipated changes in the price level is not

As a final consideration in this general connection something should be said about the assumption that investors assume the rate to remain prospectively unchanged throughout the future, or that their calculations are unaffected by prospective changes. The only grounds for the rational anticipation of a change in the real rate of interest, i.e., the marginal productivity of new investment, seem to be these: If other things were to remain equal, the rate would presumably fall gradually through time with the progress of investment, in consequence of the operation of diminishing returns. On the other hand, the rate might rise, in consequence of the same principle, if it were expected that other factors would increase in supply faster than capital—measured, of course, by the net effect of changes in all other factors. Or, again, the rate might be raised, or lowered, in consequence of new inventions changing the technical mode of combining given amounts of capital with other factors.[25]

In general a rise or fall in the productivity of capital over the whole field of investment, but not connected with any specific change in the technical character of investment, would simply be capitalized into the present going rate—and similarly as regards the prospective opening up of new, or closing of old, fields of investment. Competition should at once diffuse the prospective effect over the whole field of investment as well as over time, giving rise to a new uniform rate on all types of investment. But there are complexities here; the capitalization of anticipations affected by variation is a mathematical problem which will not be entered upon in this essay. It is in order, however, to stress the fact that in so far as any capitalization—which is to say, any valuation—or any plan of action strives for accuracy, it must attempt to include effects of change as well as to allow for the possi-

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difficult to compute. (But Professor Fisher's calculations involve the rather strange assumption that it is the rate of price change which is decisive, not the absolute change over the period of the loan; cf. *The Theory of Interest*, chap. xix.) Anticipated changes in "the" rate of interest, i.e., in the real marginal productivity of investment, are a different matter; see next paragraph of text.

[25] We confront the vitally important problem as to the meaning of other factors; certainly, neither labor nor natural agents can be put in this category without important reservations. Discussion of this issue must, however, be postponed; it will form one of the main themes of the second division of the essay.

bility of changes which *may* happen but cannot be foreseen. Profit in the theoretical sense (including loss) is largely a matter of changes in the value of assets, not a difference between current income and outgo apart from realization or accrual of such changes; and all estimated costs and returns to enterprise are also largely affected by capitalized anticipations.

In the foregoing we have discussed the theory of capital and interest at a moment and on the assumptions of perfect foresight and of the measurement of all values in money of constant purchasing power. A second part of the essay will discuss the theory in relation to supply and demand curves and equilibrium. The notion of measurable change in capital quantity presents a far more serious problem than that of capital quantity at a moment. The main thesis will be that there is no ground for drawing a supply curve for capital, i.e., for assuming that there is any functional relation connecting the interest rate with a (stationary) total supply. Hence, it is not allowable to speak of an equilibrium rate of interest other than the theoretical market rate in a given situation at a moment (to be distinguished from what is generally referred to as the short-run rate). Since the supply of capital cannot change without changing the conditions in relation to which it changes, there is no reason to assume that any change will show a tendency to equalize the forces bringing it about (if it is brought about by "forces") and come to a stop; it is just as likely to increase the generating disequilibrium and go on indefinitely, even at an increasing speed.

This also applies to other basic factors in economic life, such as population, education, wants, and technology, as well as to capital supply; there is absolutely no presumption that actual changes in historic time will tend to establish equilibrium. Hence the only valid meaning for stationary conditions is the assumption, for purposes of analysis, that certain features of an economic system remain fixed while others move into a position of equilibrium among themselves and in relation to the fixed framework. Such a system needs to be set up much more carefully than has generally been done if it is to be meaningful.

[*To be continued*]

THE MOTOR CARRIER ACT OF 1935

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WHEN President Roosevelt signed S. 1629 on August 9, 1935, a major change in the transport regulatory policy of the federal government was effected and there ended the legislative contest between rail and automotive interests which had been raging in the halls of Congress for ten years. Henceforth, the fight between these industries over controversial regulatory issues will be staged in the hearing rooms of the Interstate Commerce Commission and before the courts, for the Motor Carrier Act of 1935 vests in the former the authority to regulate motor carriers of passengers and property and brokers engaging in interstate service. In this article the history of this legislation in Congress will be reviewed first and will be followed by a statement of the underlying principles upon which this legislation is based, as background for a short analysis of the regulatory controls established and of the possible economic and political effects of this regulation.

I. LEGISLATIVE HISTORY OF THE MOTOR CARRIER ACT

Until 1925 the states generally applied their motor-carrier statutes to interstate as well as to intrastate carriers on the theory that they were within their rights in doing so as long as the federal government did not invoke its constitutional authority under the commerce clause to regulate this class of carrier. So long as the states were not restrained from this practice, there was no recognized need for federal regulation of the industry. However, when the United States Supreme Court decided in the Buck and Bush cases that a state cannot restrain wasteful competition and unnecessary operations by withholding the issuance of a certificate or a permit to an interstate carrier,[1] the state public service com-

[1] *Buck* v. *Kuykendall*, 267 U.S. 307, and *Bush and Sons Company* v. *Maloy*, 267 U.S. 317, both decided March 2, 1925.

missions, through their national organization, the National Association of Railroad and Utilities Commissioners, demanded that Congress enact legislation to remedy the disorganized and demoralized conditions in state regulation caused by these decisions. The railroads, already effective lobbyists in the state legislatures, and eager to promote any legislation which might hinder the growth of commercial motor transportation, immediately joined forces with the state commissions in asking Congress for motor-carrier regulation.

From March 3, 1925, when the first motor-carrier regulatory bill, H.R. 12474, was introduced by Representative Cable, to 1935, there were introduced in Congress thirty-four separate bills to regulate motor carriers, and not a session of Congress during this period failed to consider this regulatory issue. Hearings by congressional committees were held on the Cummins and Bacharach bills in 1926, on the Parker bills in 1928 and 1930, on the Couzens bill in 1932, and on the Rayburn bill in 1934.[2] Moreover, as a result of the growing interest in Congress in this issue, the I.C.C. on its own motion undertook two investigations, one beginning in 1926 and the other in 1930, to determine the extent of motor-bus and truck operations, the effect of motor-carrier competition upon the railroads, and whether there existed a need for federal regulation of interstate motor carriers.[3]

Although the I.C.C. recommended in its case, *Motor-Bus and Motor-Truck Operation*, that Congress enact legislation to regulate common carriers of passengers, and in its case, *Coordination of Motor Transportation*, not only reiterated its advocacy of such regulation but also recommended less restrictive regulation of common and contract motor carriers of property, none of these many bills received the approbation of both houses of Congress. In spite of the general adoption of regulatory measures by the states, and of the support given these bills by the state commis-

[2] For a complete discussion of legislative proposals, see the writer's doctoral dissertation, *The Extent and Status of Motor Transport Regulation in the United States* (MS, University of Virginia, 1934).

[3] *Motor-Bus and Motor-Truck Operation*, 140 I.C.C. 685, decided April 10, 1928, and *Coordination of Motor Transportation*, 182 I.C.C. 263, decided April 6, 1932.

sioners, the I.C.C., the railroads, the bus operators, and a few of the common-carrier truck operators, the strong and active opposition of the automobile manufacturers, the organized shippers, and the majority of truck operators, particularly the contract-carrier group, sufficed, given the lack of interest shown by the general public, to prevent enactment of any of these bills.

Perhaps the most vigorous objections were registered by the automobile manufacturers, who believed that the purpose of the I.C.C. in regulating motor carriers would be to restrict the growth of motor transportation for the benefit of the railroads, thus diminishing the demand for trucks and buses. The shippers also voiced powerful protests, fearing that the new regulation would tend to raise transport rates by reducing competition. This apprehension was based upon an observed tendency for state regulatory agencies to relate truck rates to the higher rail basis. Although not well organized to represent the national point of view, there was active opposition by contract-carrier and some common-carrier truck operators, who feared that regulation would tend to destroy the flexibility of their service, their greatest competitive advantage over rail carriers, and that rate regulation, if effective, would destroy the advantage they enjoyed owing to their freedom to undercut rail rates at will. The indifference of the general public is explained partly by its usual apathy toward public matters and its failure to comprehend the long-run effects of an oversupply of transport service, and partly by the vague general belief that the consumer gained from low competitive transport rates. Considering the many conflicting opinions and the generous misapplication of fact used in the propaganda issued by partisan bodies, the indifference of the general public cannot be a subject of wonder.

The prospect of federal control of the business of motor carriers was improved, however, when the shrinkage of traffic resulting from the low volume of production and trade in depression years and the falling rate level caused in part by rapidly increasing truck competition so weakened the financial position of the railroads that it was necessary for the federal government, through the Reconstruction Finance Corporation, to lend them

hundreds of millions of dollars to avert widespread bankruptcy.[4] Investors, aroused by the serious plight of the railroads, demanded action by Congress and the railroad managements designed to protect their investments in rail securities, long regarded as gilt-edge, from the low market values resulting from the reduced earning power of the rail carriers.[5]

This spasm of concern in regard to the future of rail transportation was evidenced by the organization of numerous committees of businessmen and bankers to consider means to solve the problem and in the enactment by Congress of the Emergency Railroad Transportation Act of 1933, establishing the office of Federal Co-ordinator of Transportation.[6] These developments and the experience gained by the federal government in the regulation of motor carriers under the codes of fair competition promulgated under the N.I.R.A. paved the way for the enactment of the Motor Carrier Act of 1935.

In 1932 the large investors in railroad securities organized the National Transportation Committee to study the transportation problem and to make recommendations as to measures to improve the position of the rail carriers.[7] The report of this com-

[4] The R.F.C. lent to the railroads, from February 2, 1932, when it was organized, to March 3, 1933, $325,417,074.57, and from March 4, 1933, through December 31, 1935, $161,799,749.54. There were outstanding as of December 31, 1935, loans in the amount of $396,249,860.90 to fifty-six railroads, including twenty-three in receivership or that have filed petitions under the Bankruptcy Act. See *Summary of the Activities of the Reconstruction Finance Corporation and Its Condition as of December 31, 1935* (January, 1936).

[5] In 1936 there are ninety-three railroads in bankruptcy or receivership which own 65,272 miles of road, or approximately 26.77 per cent of the mileage of the country, according to a statement of Joseph B. Eastman, Federal Co-ordinator of Transportation. Cf. press release in regard to "Proposed Orders Requiring Certain Unifications of Railroad Terminal Facilities," issued February 1, 1936.

[6] Cf. R. W. Harbeson, "The Emergency Railroad Transportation Act of 1933," *Journal of Political Economy*, XLII (1934), 106–26.

[7] The seriousness with which the railroad problem was regarded is indicated by the illustrious persons appointed to serve on this committee (Calvin Coolidge, chairman; Alfred E. Smith, Bernard M. Baruch, Clark Howell, and Alexander Legge), and by the fact that Harold G. Moulton of the Brookings Institution was selected to organize the research staff. The results achieved by this staff were published in 1933 by the Brookings Institution in a book entitled *The American Transportation Problem* (Washington, D.C.).

mittee received much publicity and the serious consideration of every group interested in transportation problems, and it unquestionably influenced Congress to a considerable extent in enacting legislation a few months later authorizing the appointment of the Federal Co-ordinator of Transportation. In substance, with respect to regulation, the Committee recommended that federal control be extended to all agencies of transportation, holding that "the situation requires general Federal jurisdiction of motor transport." Specific suggestions regarding the scope of the recommended legislation were not made, although the principle that restrictions should not be placed upon automotive transportation for the express benefit of the railroads was laid down to guide legislators.[8]

In enacting the Emergency Railroad Transportation Act of 1933, Congress showed that it realized that more fundamental action than had yet been taken was necessary if the rail carriers were to be placed on an earning basis again. This Act created the temporary office of Federal Co-ordinator of Transportation[9] to "encourage and promote or require action" by the railroads which will avoid "wastes and preventable expense" and to study and consider means "of improving transportation conditions throughout the country" and from time to time to submit to the President and Congress, through the I.C.C., "such recommendations calling for further legislation to these ends as he may deem necessary or desirable in the public interest." Joseph B. Eastman, one of the commissioners of the I.C.C. and a man of outstanding ability and long experience in transportation, was appointed by the President to act as the Co-ordinator.

Among the many subjects considered by Co-ordinator Eastman only the question: "Is there need for Federal legislation to regulate other transportation agencies and to promote the proper co-ordination of all means of transport?" need concern us here.

[8] In a supplemental opinion, Alfred E. Smith qualified his indorsement of the action recommended by holding that motor transport regulation by a federal agency would not solve the railroad problem and by stating that he favored only safety and financial responsibility controls for motor carriers.

[9] By joint resolution (approved June 14, 1935) Congress continued the office of Federal Co-ordinator of Transportation to June 17, 1936. Although Mr. Eastman advocated its continuance as a permanent body, it was allowed to expire on this date.

In his second report to Congress, *Regulation of Transportation Agencies*,[10] the Co-ordinator discussed this question thoroughly and concluded that both the water lines and the motor trucks and buses should be brought under a greater degree of federal regulation; that the aim of Congress should be to obtain a well-knit national transportation system, with each form of transportation playing its appropriate part with a minimum of waste and duplication; and that, to achieve this end, federal regulation of all agencies of transportation should be co-ordinated in the hands of the I.C.C. With respect to motor transportation, a regulatory bill, differing from the Rayburn bill[11] only in minor details, was recommended for immediate enactment. This bill was introduced (by request) in the Senate as S. 3171 by Senator C. C. Dill of Washington on March 23, 1934, and referred to the Senate Committee on Interstate Commerce, where it was allowed to rest without action for the remainder of the session.

That Congress failed during the 1934 session to take action upon this recommendation was a matter of surprise to those interested in this legislation. However, a number of factors explain this situation. First, the second session of the Seventy-third Congress was an extremely busy one, and many important bills preceded the motor-carrier measure on the legislative docket. Second, neither Congress nor the general public had had sufficient time to study the Eastman reports to be greatly influenced by them at this time. Third, under the N.I.R.A. codes of fair competition for the transit, bus, and trucking industries had been promulgated, and those industries urged Congress to give them an opportunity to operate under "self-regulation" for a period sufficient to ascertain whether this form of regulation would be workable in lieu of federal control.[12]

[10] Submitted by the I.C.C. on March 10, 1934 and printed as *Sen. Doc. 152* (73d Cong., 2d sess.).

[11] H.R. 6836, introduced by Representative Sam Rayburn of Texas on January 12, 1934.

[12] See the statements of Harold S. Shertz, counsel for the American Trucking Associations, Inc., and of Arthur M. Hill, president, National Association of Motor Bus Operators, at the hearings upon H.R. 6836 held before the House Committee on Interstate and Foreign Commerce (73d Cong., 2d sess., January 17–February 2, 1934).

Early in the first session of the Seventy-fourth Congress the Eastman motor-carrier bill was introduced in the House of Representatives by Representative George Huddleston of Alabama as H.R. 5262 and in the Senate by Senator Burton K. Wheeler of Montana as S. 1629. This time, with certain amendments which do not change in any essential respects the structure of the regulatory plan originally proposed, the measure passed both houses and was signed by President Roosevelt on August 9, 1935.[13] An important factor contributing to its enactment during this session lies in the demise on May 27, 1935, of the N.I.R.A. as a regulatory measure, when the Supreme Court of the United States handed down its decision in the now famous Schechter case. This development converted the for-hire trucking industry, as represented by its national trade association, the American Trucking Associations, Inc., from an opponent of business regulation by the I.C.C. into an active sponsor of the bill. With the crumbling of this code-regulatory structure which, however, had established the principle of federal regulation in this industry, there was no other course open than to support the Eastman measure and to attempt to obtain, through negotiation, an act as favorable to the interests of the trucking industry as possible.[14]

[13] Public Act No. 255 (74th Cong., 1st sess.), cited as Part II of the Act To Regulate Commerce.

[14] The trucking industry was not undivided in its allegiance to the code form of regulation. At the first annual convention of the American Trucking Associations, Inc., in Chicago, October 22, 1934, there was a schism on this question which nearly broke up the association, the common-carrier group favoring regulation of the strong type by the I.C.C., while the contract-carrier group advocated continuation of the Code. However, a compromise was reached whereby it was agreed that the A.T.A. would "co-operate with the Federal Co-ordinator of Transportation and the Administration in the development of an economically sound national transportation policy; at the same time, preserving and continuing for the industry the benefit of self-regulation under the Code of Fair Competition. . . . ." This policy was modified somewhat in April, 1935, when the association decided it would support the Eastman bill, provided that the I.C.C. be reorganized and the Code be continued under the supervision of the Federal Co-ordinator of Transportation. However, at a meeting of leaders of the industry in Washington on June 17 and 18, 1935, three weeks after the Schechter decision, it was decided to support the Eastman bill, despite the unlikelihood of reorganization of the I.C.C. and without all the desired amendments. For further details, see the weekly issues of the *A.T.A. News Bulletin*, published by the American Trucking Associations, Inc., for the period from Octo-

However, even with this development, it was necessary for President Roosevelt to place the bill on his "must" program before Congress would take action, so controversial was the issue.[15]

II. ECONOMIC PRINCIPLES UNDERLYING THE MOTOR CARRIER ACT

While discussion and evaluation of the actual policies effected by the Bureau of Motor Carriers must await an empirical basis, it is possible to discover the economic principles upon which this legislation rests, knowledge of which should promote an understanding of the substantive provisions of the Act. Analysis of the declaration of policy stated in the Act and of the statements of its advocates should reveal the economic objectives contemplated.[16]

In Section 202 of the Act it is declared to be the policy of the Congress to regulate transportation by motor carriers in such manner as to

> recognize and preserve the inherent advantages of, and foster sound economic conditions in, such transportation and among such carriers in the public interest; promote adequate, economical, and efficient service by motor carriers, and reasonable charges therefor, without unjust discriminations, undue preferences or advantages, and unfair or destructive competitive practices; improve the relations between, and coordinate transportation by and regulation of, motor carriers and other carriers; develop and preserve a highway transportation system properly adapted to the needs of the commerce of the United States and of the national defense; and cooperate with the several States and the duly authorized officials thereof and with any organization of motor carriers in the administration and enforcement of this part.

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ber 29, 1934, to June 17, 1935. The foregoing quotation is taken from a resolution adopted by the A.T.A. at their convention.

[15] On June 7, 1935, the President sent a special transportation message to Congress, in which he recommended early passage of bus and truck regulatory legislation (79 *Congressional Record* 8851).

[16] That interested parties, especially transportation lawyers, will be concerned with attempting to ascertain the motives of Congress in enacting this legislation and the standards laid down to guide the I.C.C. in administering the substantive provisions is evidenced by the appearance on November 1, 1935, of an annotated text entitled *A Legislative History of the Motor Carrier Act, 1935*, by Warren H. Wagner (Investment Building, Washington, D.C.), and, in the same year, *Federal Motor Carrier Regulation*, by Parker McCollester and Frank J. Clark (New York: Traffic Publishing Co.).

While the generality of this declaration of policy makes precise interpretation difficult, with the aid of statements of the sponsors of this legislation certain principal ideas which the Congress intended to have embodied in the administrative policy of the I.C.C. come to view. By the inclusion in the preamble of the phrases "recognize and preserve the inherent advantages of" motor transportation and "develop and preserve a highway system properly adapted to the needs of commerce" it would seem that one of the more important mandates laid down by the Congress as a guide in the administration of the Act is that the regulation prescribed should not restrict the growth of commercial motor transportation for the benefit of the railroads or for any uneconomic purpose.

This interpretation is supported by statements of Representative Sadowski of Michigan and other legislators responsible for this Act and by frequent utterances of Joseph B. Eastman. The former, in reporting S. 1629 to the whole committee of the House of Representatives on July 31, 1935, said:

> Section 202 sets forth the declaration of policy and vests jurisdiction in the Interstate Commerce Commission. I want to say in this connection that in reporting out this bill your committee has no intent to undertake to suppress or restrict in any way the proper development of motor-carrier transportation by responsible carriers for the good of the public interest. Nor do we want motor-carrier transportation subservient to or restrained or curtailed by any other transportation medium.[17]

In appearing before the Senate Committee on Interstate Commerce as a sponsor for S. 1629, Mr. Eastman emphasized the point that "there is no intent in this proposed legislation to suppress or restrict the proper development of any form of transportation,"[18] and subsequently, as chairman of the division of the I.C.C. assigned to administer this legislation, he has reiterated this principle.[19]

In the declaration of policy there is set forth the additional

[17] 79 *Congressional Record* 12205.

[18] *Hearings on S. 1629, S. 1632, and S. 1635, Senate Committee on Interstate Commerce* (74th Cong., 1st sess., February 25–March 6, 1935), p. 61.

[19] A recent statement of this principle may be found in his published address before the Associated Motor Carriers of Oklahoma, Tulsa, Okla., Feb. 3, 1936, p. 3.

principle that the I.C.C. shall regulate competition in such manner as to "improve the relations between, and co-ordinate transportation" agencies. Since the Motor Carrier Act is one of the first of the Federal Co-ordinator's recommendations to be enacted into law, it seems obvious that Congress recognized it as a measure to promote the development of a well-rounded and economically co-ordinated transportation system. To what extent this and the foregoing principle will prove contradictory in the actual application of the substantive provisions of the Act is now unknown, but it is worth while to note that the prescription "to develop and preserve a highway transportation system properly adapted to the needs of the commerce of the United States . . . ." contains the word "properly," which may prove susceptible of broad interpretation by the I.C.C. and the courts. Should a "rail-minded" Commission desire to protect the rail carriers by handicapping motor-carrier service, it might find this loophole useful despite the clear mandate not to restrain the development of the newer agency. Even if the Commission should lean over backwards to avoid a charge of "rail-mindedness" in dealing with motor carriers, there remains the very real problem of ascertaining on the basis of fact the proper economic spheres for the two agencies. With motor carriers rapidly expanding their areas of operation and types of service, one of the more important economic problems with which the Commission will have to deal concerns this very question of whether a policy of co-ordination demands restriction of motor-carrier service, and, if so, to what extent.

A third controlling principle expressed in the declaration of policy for the guidance of the Commission consists of a mandate to "foster sound economic conditions" in motor-vehicle transportation, to "promote adequate, economical, and efficient service by motor carriers," and to prevent unfair or destructive rates or other competitive practices. As Mr. Eastman expressed it, "The general purpose is to introduce a greater degree of order and stability into the situation with respect to these motor vehicles, and a greater degree of what is called in the Constitution, domestic tranquillity, with benefits which, we think, will be realized

by all. . . . ."[20] Analysis of the substantive provisions of the Act shows that they are well designed to accomplish this purpose, if the regulation contemplated can be made effective. Competitive conditions will tend to be stabilized by such provisions as the following: control over entry into the business, the necessity of publishing and adhering to filed rates and of complying with financial responsibility, labor, and safety of operations standards. These controls will doubtless render it considerably more difficult for truck drivers and others to establish themselves in the trucking business by the familiar device of cutting rates, thereby effecting a diversion of the traffic from existing motor and rail carriers. Whether such a result will, as predicted by the sponsors of this legislation, react to the public or shipper good in the long run remains to be seen, although, if stabilization is actually accomplished, carriers having well-financed and well-established businesses prior to the effective date of this law should stand to gain from the elimination of competition from the irresponsible "wildcatter" operators. Doubtless, anticipation of such benefits is responsible for the willingness of the larger bus and truck operators, particularly the common carriers, to support federal regulation.

The pivotal issue which will confront the Commission is whether the public interest can best be served by prescribing parity in the rates of common and contract carriers. Mr. Eastman has frequently stated that regulation is provided not only for the common carriers but for the contract carriers "for the protection principally of the common carriers."[21] Whether contract-carrier service should be subordinated to common-carrier service has frequently been considered by the state utility commissioners, and the policy of protecting indispensable common-carrier service appears to be enlisting substantial support.[22]

[20] In his statement before a subcommittee of the *House Committee on Interstate and Foreign Commerce, Hearings on H.R. 5262 and H.R. 6016* (74th Cong., 1st sess., February 19–March 5, 1935), p. 27.

[21] For a more complete account of Mr. Eastman's views on this question see his statement before the *Senate Committee on Interstate Commerce, Hearings on S. 1629 et al.* (74th Cong., 1st sess.), pp. 68–69.

[22] For example, in Order M.V. No. 22787, decided January 15, 1936, the Washington Department of Public Service held that contract carriers must charge the same

Furthermore, it is clear both from the declaration of policy and from paragraph (*c*) of Section 202 that Congress has instructed the I.C.C. to decentralize the administration of the Act in such a manner as to co-operate fully with state commissioners in regulating motor carriers, and to preserve the authority of the several states to control essentially intrastate operations and to tax motor vehicles in order to secure funds for construction and maintenance of the public highways. This principle represents a trend away from domination of the state commissions by the I.C.C. Later in this article there appears a discussion of the rather novel administrative procedure adopted to accomplish this purpose.

While the substantive provisions of the Act are definitely stated for the most part, nevertheless the I.C.C. is allowed considerable discretion in formulating regulatory policy. Although the principles pronounced in the declaration of policy cannot be considered as modifying the plain language of other sections of the Act, it will be noted that certain of these sections refer specifically to these principles and, even when no such reference is made, the Commission will doubtless regard these as indication of the standards in accordance with which the provisions of the Act are to be administered.

III. APPLICATION OF THE ACT IN GENERAL

The Motor Carrier Act applies generally to the transportation of passengers or property by motor carriers engaged in interstate or foreign commerce and to the procurement of and the provision of facilities for such transportation. Section 202*c* definitely restricts the application of the regulation authorized to carriers and brokers engaged in an interstate or foreign business. The term "interstate commerce" is defined as "commerce between

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rates as common carriers "under substantially similar conditions" on the theory that this policy is necessary to the maintenance of indispensable common-carrier service. In the case *Harry Prater et al.* v. *The Department of Public Service of the State of Washington et al.* (decided May 13, 1936) Judge Wm. A. Huneke of the Superior Court for Spokane County held this order and the Washington motor-carrier statute, chap. 184, Laws of 1935, unconstitutional. The case is being appealed to the State Supreme Court.

any place in a State and any place in another State or between places in the same State through another State, whether such commerce moves wholly by motor vehicle or partly by motor vehicle and partly by rail, express, or water." However, the practical question of which specific motor-carrier and brokerage operations are to be included under, or excluded from, the jurisdiction of the Commission is a difficult one to answer until that agency or the courts have decided a sufficient number of borderline cases to render empirical generalizations possible.[23]

The regulation authorized applies primarily to common and contract motor carriers of passengers and property and to transportation brokers, and secondarily and only conditionally to private carriers of property. Moreover, certain specified classes of carrier are excepted either entirely or conditionally. While it is impossible to make a general statement covering the application of the Act to all carriers, the general nature of the regulation prescribed for the various classes of carrier and the exceptions granted will be indicated in this section, while treatment of the specific regulations will be reserved for subsequent discussion.

Section 204 of the Act makes it the duty of the Commission to establish reasonable requirements for common carriers[24] with respect to continuous and adequate service, transportation of baggage and express, uniform systems of accounts, records, and reports, preservation of records, qualifications and maximum hours of service of employees, and safety of operation and equipment. With respect to contract carriers,[25] the duties of the Com-

[23] By numerous notices to the public, by sending men to all parts of the nation to confer with bus and truck operators, and through the state commissions, the I.C.C. has advised every carrier who has any doubts about the interstate nature of his operations to file applications for certificates or permits in order to protect whatever rights he may have under the "grandfather clause" and to avoid violation of the law.

[24] Defined as "any person who or which undertakes, whether directly or by a lease or any other arrangement, to transport passengers or property, or any class or classes of property, for the general public in interstate or foreign commerce by motor vehicle for compensation, whether over regular or irregular routes, including such motor vehicle operations of carriers by rail or water, and of express or forwarding companies, except to the extent that these operations are subject to the provisions of part I."

[25] Defined as "any person, not included under paragraph (14) of this section, who or which, under special and individual contracts or agreements, and whether

mission are similar except in regard to the requirements as to continuous and adequate service and transportation of baggage and express. Private carriers of property[26] are to be entirely unregulated except that if need for such regulation is found the Commission may establish reasonable requirements to promote safety of operation, and to that end it may prescribe qualifications and maximum hours of service of employees and standards of equipment.[27] With respect to transportation brokers,[28] the Commission may establish reasonable requirements in regard to licensing, financial responsibility, accounts, records, reports, operations, and practices. The power to inquire into the organization and management of motor carriers and brokers and to enforce all provisions of the Act is also given the Commission.

The application of the Act is limited by the exemptions provided for in Section 203*b*. Except for the provisions relating to qualifications and maximum hours of service of employees, and safety of operation and standards of equipment, the Act does not apply to motor vehicles employed solely in transporting school children and teachers to and from school; taxicabs, or other motor vehicles performing a bona fide taxicab service, having a capacity of not more than six passengers and not operated on a regular route between fixed terminuses; motor vehicles owned or operated

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directly or by a lease or any other arrangement, transports passengers or property in interstate or foreign commerce by motor vehicle for compensation."

[26] Defined as "any person not included in the terms 'common carrier by motor vehicle' or 'contract carrier by motor vehicle,' who or which transports in interstate or foreign commerce by motor vehicle property of which such person is the owner, lessee, or bailee, when such transportation is for the purpose of sale, lease, rent, or bailment, or in furtherance of any commercial enterprise."

[27] If it is determined by the Commission that private carriers should be so regulated, then, in addition to establishing safety and hours of service standards, the Commission may require them to keep prescribed accounts, make reports, preserve their business records, file the proper designation of statutory agents for service of orders and process, and the Commission may investigate the manner of compliance with the applicable provisions, and subject them to the penalties stipulated in the Act.

[28] Defined as "any person not included in the term 'motor carrier' and not a bona fide employee or agent of any such carrier, who or which, as principal or agent, sells or offers for sale any transportation subject to this part, or negotiates for, or holds himself or itself out by solicitation, advertisement, or otherwise as one who sells, provides, furnishes, contracts, or arranges for such transportation."

by or on behalf of hotels and used exclusively for the transportation of hotel patrons between hotels and local railroad or other common-carrier stations; motor vehicles operated under authorization, regulation, and control of the Secretary of the Interior, principally for the purpose of transporting persons in and about the national parks and national monuments; motor vehicles controlled or operated by any farmer and used in the transportation of his agricultural commodities and of supplies to his farm; motor vehicles controlled and operated by a co-operative association as defined in the Agricultural Marketing Act, approved June 15, 1929, as amended; trolley buses operated by electric power derived from a fixed overhead wire, furnishing local passenger transportation similar to street-railway service; or to motor vehicles used exclusively in carrying livestock, fish, agricultural commodities, or in the distribution of newspapers. Furthermore, except for the provisions relating to safety of operation and hours of service of employees, unless and to the extent that the Commission shall find further application is necessary to carry out the policy declared in Section 202, the provisions of the Act do not apply to the transportation of passengers or property in interstate or foreign commerce wholly within a municipality or between contiguous municipalities, provided that the state laws are observed by the passenger carriers so engaged; or to the casual, occasional, or reciprocal transportation of passengers or property in interstate and foreign commerce for compensation by any person not engaged in transportation by motor vehicle as a regular occupation or business.

While space does not permit undertaking to give complete explanations to account for these exemptions, some comments upon them are necessary to an understanding of the Act. School buses, trolley buses, taxicabs, hotel vehicles, and motor vehicles under the authority of the Secretary of the Interior are commonly exempted by the state motor-carrier statutes. These operations either present essentially local problems and are adequately regulated by local authorities or are under the control of the federal

government.[29] Thus, such exemptions in the Motor Carrier Act are in line with accepted practice. The exemptions applying to vehicles of farmers and farm organizations have little effect since these vehicles would be classed as private carriers of property in most cases, subject only, and then conditionally, to safety of operations and hours of service regulations. However, the exemptions applying to vehicles used exclusively in transporting livestock, fish, agricultural products, and newspapers are another matter. Their effect will be to exclude from the authority of the Commission, so far as business regulation is concerned, an extensive field of for-hire trucking within which there has been an intensive and rapid development. Doubtless the decision to exclude these operations can be attributed in part to strong opposition from farm and newspaper organizations as well as to a belief that to leave unregulated these widespread but often irregular and seasonal operations would simplify the problem of administration of the Act.[30] Similarly, the conditional exemption accorded casual, occasional, or reciprocal for-hire operations was doubtless made for practical reasons, for such operations neither present serious problems nor are susceptible of effective regulation. The conditional exemptions applying to transportation wholly within a municipality or within contiguous municipalities, even if divided by state lines, appear to constitute recognition of the essentially local character of these operations, and of the fact that generally supervision of these operations has been left to the cities.[31] This reasoning is supported by the fact that where the

[29] For the exact status of these exemptions in the state statutes through the 1935 sessions of the legislatures see Appendix A of the reply brief of the Department of Public Service of the State of Washington in the case *Harry Prater et al.* v. *The Department of Public Service et al.*, prepared by the writer.

[30] See the statements of Fred Brenckman, Washington representative for the National Grange, W. S. Campfield, representing the Eastern Apple Growers' Council, and Charles E. Blaine, traffic manager of the American National Livestock Association, before a subcommittee of the *House Committee on Interstate and Foreign Commerce, Hearings on H.R. 5262 and H.R. 6016*, February 19–March 5, 1935.

[31] This exemption will take care of situations such as New York City and the contiguous Jersey cities present where, although the movements there-between are interstate, they are, nevertheless, for all practical purposes, largely local in nature. On March 23, 1936, a hearing on the "contiguous municipality" question as related

intercity movement is an organic part of a complete movement from a point outside the city or destined to a point outside the city the exception no longer applies.

It is not known precisely how many carriers or how many vehicles will be under the jurisdiction of the I.C.C. under the Motor Carrier Act.[32] Various estimates have been made to indicate the number of motor carriers which this agency is undertaking to regulate, and while strict accuracy cannot be attained, nevertheless these estimates constitute a rough approximation of the magnitude of the job which has been delegated to the Bureau of Motor Carriers.

According to the Automobile Manufacturers Association estimates, 3,550,000 trucks were registered in the United States during 1935, of which 900,385, or roughly 25 per cent, were owned and operated by farmers.[33] Obviously, not all registered trucks will be subject to the control of the I.C.C., for only those operating in interstate or foreign commerce and, in addition, those not exempted from the application of the Act, are subject to regulation. While the American Trucking Associations, Inc., in 1934 registered 300,475 for-hire vehicles under the Code of Fair Competition for the Trucking Industry, only 59,142, or 19.68 per cent, of these were operated in interstate commerce.[34] Doubtless, at least this number of vehicles will be under the control of the I.C.C., for, while some of these may be exempt, it is generally believed that not all for-hire operations were registered under the Trucking Code. Assuming that there are approximately 450,000 for-hire trucks in the United States, and applying the above fac-

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to St. Louis, Mo., and East St. Louis, Ill., was held before Examiner Coyle in St. Louis.

[32] The Bureau of the Census, United States Department of Commerce, is now engaged in taking a census of commercial motor-vehicle transportation, including both passenger and property carriers. In this canvass all carriers will be classified as doing either a local, intrastate, or interstate business, and according to legal characteristics.

[33] *Preliminary Facts and Figures*, released December 31, 1935.

[34] Cf. Table F, p. 320, being a part of a statement of William G. Fitzpatrick on behalf of this association in the *Hearings before the Senate Committee on Interstate Commerce on S. 1629 et al.*, February 25–March 6, 1935.

tor, there should be about 90,000 trucks subject to the jurisdiction of this agency. Since a breakdown of these Code registration figures showed an average of 1.6 vehicles per registrant,[35] it would appear that somewhere in the neighborhood of 56,000 for-hire truck operators will be subject to the Motor Carrier Act.[36] Should need be found for regulation of private carriers of property, then a sizeable proportion of the 3,100,000 trucks remaining after the for-hire vehicles are subtracted would be subject to the control of the I.C.C. so far as safety of operations and qualifications and maximum hours of service of employees are concerned.[37]

With respect to motor carriers of passengers, the I.C.C. will have a smaller number of companies to regulate, since this industry is composed of larger-scale units as measured by the number of buses per carrier, and is less extensive than the trucking industry. According to figures compiled by *Bus Transportation*, while there were 111,500 buses in the United States in 1933, only 5,000 of these were engaged in interstate service.[38] Since on the average each bus company operates approximately ten buses, the number of companies subject to the Motor Carrier Act doubtless will be in the hundreds instead of in the thousands as in the case of the trucking industry.[39]

[35] *Ibid.*, Chart I, p. 309.

[36] According to Joseph B. Eastman, it is thought "not improbable . . . . that the number of applications under the 'grandfather clause' may be as great as 250,000." Cf. his address before National Association of Railroad and Utilities Commissioners (*Proceedings* [1935], p. 122).

[37] If it can be assumed that 20 per cent of the vehicles operated by private carriers were operated in interstate commerce, there would be approximately 620,000 vehicles subject conditionally to these safety provisions. The Bureau of Public Roads in its New Jersey traffic survey found that 27.5 per cent of the private trucks in that state were operated in interstate commerce, although that proportion may be high for the nation as a whole (cf. *Motor Truck Facts* [1935 ed.; Automobile Manufacturers Association], p. 19).

[38] *Automobile Facts and Figures* (1934 ed., National Automobile Chamber of Commerce), p. 76.

[39] According to Arthur M. Hill, president of the National Association of Motor Bus Operators, under the Code of Fair Competition for the Motor Bus Industry it was found that each company operated on the average about 10¼ buses. See his statement before the *Senate Committee on Interstate Commerce, Hearings on S. 1629 et al.* (74th Cong., 1st sess.), p. 182.

In undertaking to regulate interstate motor transportation the I.C.C. thus has a very different proposition to work with than it had when it started to regulate the rail carriers fifty years ago. Instead of dealing with less than a thousand large and well-organized corporations having detailed accounting systems and following efficient business practices, it now must deal with many thousand small-scale business units, in many of which the owner acts as driver of the vehicle, freight solicitor, bookkeeper, and mechanic. The Motor Carrier Act presents a more difficult administrative problem than that with which the I.C.C. is intrusted in carrying out railroad regulation.

IV. THE REGULATORY STRUCTURE

The only singular feature of the regulatory plan established by the Motor Carrier Act is the administrative procedure provided, and this will be treated in the next section of this article. The substantive regulatory provisions for the most part follow the pattern of state motor-carrier regulation, although there are variations in the details. An outline of the more important controls established follows, with some comment concerning the objectives of each.

CONTROL OF COMPETITION

Control over the supply of motor-carrier service is effected by requiring common carriers to secure certificates of public convenience and necessity, contract carriers to secure permits, and brokers to secure licenses as authority to operate in interstate commerce. Under the so-called "grandfather clauses" in Sections 206 and 209, all common carriers in bona fide operation on June 1, 1935, and all contract carriers in bona fide operation on July 1, 1935, are entitled as a matter of right to receive the necessary certificates or permits without a hearing upon filing application according to the proper form. The effect of this provision is to maintain the status quo in the motor-carrier service for the near future, since it limits the power of the Commission to deny applications for authority to operate.[40] It is unlawful for carriers

[40] February 12, 1936, was established as the latest date on which application under the "grandfather clause" could be filed. Few applications under this clause

not having "grandfather clause" rights to begin operations without authority from the Commission.

The specific criteria laid down to guide the Commission in deciding applications for certificates are few. The carrier must be found "fit, willing, and able properly to perform the service proposed" and to conform to the regulations prescribed by the Commission, and it must be found that the proposed service "is or will be required by the present or future public convenience and necessity." The specific criteria in the case of applications for contract-carrier permits are the same except that the proposed service must be found "consistent with the public interest and the policy declared in section 202*a*" rather than required by the present or future public convenience and necessity. While the Commission may attach "reasonable terms, conditions and limitations" to the certificates and permits granted, this agency cannot "restrict the right of the carrier to add to his or its equipment and facilities" over the routes or within the territory specified "as the development of the business and the demands of the public shall require." The criteria to guide the Commission in deciding applications for brokers' licenses are the same as for contract carriers.[41]

While the certificates, permits, and licenses required are for an indeterminate period, the Commission is given the power to amend

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were filed with the Commission until the Bureau of Motor Carriers in January, 1936, sent its representatives to all parts of the country to confer with bus and truck operators. Apparently, the small carriers either failed to appreciate the value of this right, or failed to regard the Act very seriously until the matter was explained to them personally. This necessity "of taking the Act to the carriers" demonstrates aptly how much more difficult it will be to regulate this industry than the rail carriers with their adequate legal staffs to advise them and to represent them in such matters.

[41] In order to have complete control over the supply of motor-carrier service, and to eliminate certain unethical practices, it has been found necessary for regulatory commissions to extend their authority to include brokers. For example, the Washington Department of Public Service, in prosecuting truckers for rate violations, in 1935 found it necessary to inquire into the influence exerted over these carriers by transportation brokers, and, as a result, has subjected them to strict regulation of charges, financial responsibility, observance of filed tariffs, and authority to operate.

or revoke any certificate, permit, or license upon cause after the proper proceedings have been held. However, except on application of the holder, no such authority shall be revoked unless the holder "wilfully fails to comply, within a reasonable time, not less than ninety days" with an appropriate order of the Commission commanding obedience to the regulation in question.

The question now arises: Should a policy of restricting the supply of motor-carrier service for the purpose of preventing an oversupply of transport service or for other purposes, such as "co-ordination" of transport facilities, be adopted, how far could the Commission go toward realizing this objective? The "grandfather clause" makes it impossible for the Commission to restrict service in the beginning. Moreover, although the Commission does have the power to deny applications for authority to establish new service or to extend existing service, Sections 208*a* and 209*b* protect the right of the motor carriers to add to their equipment and contracts within the scope of their operating authority "as the development of the business and the demands of the public may require." Thus, if it can be assumed that most of the carriers operating when the Act went into effect will protect their rights under the "grandfather clause," it would seem that the power of the Commission to restrict competition either within the motor-transport industry or between motor carriers and other carriers is considerably limited. As the law now stands, it can restrict the number of carriers who may establish themselves in business, and it may force existing carriers to limit their service to the routes now operated, but it appears that it cannot restrain these carriers from expanding their volume of business over their authorized routes by equipping themselves with the necessary facilities. On the other hand, since there has been a marked tendency for motor carriers to push out into new territories, even to the extent of establishing transcontinental routes,[42] and since

[42] Keeshin Transcontinental Freight Lines, Inc., made a test run from Chicago to Los Angeles in December, 1935, with a fleet of five tractor-semitrailer vehicles in five days, and is said to be contemplating the establishment of regular service between these cities in the near future. Cf. *Motor Transportation* (January, 1936), p. 15. See also Neil M. Clark, "Trucking from Coast to Coast," *Public Utilities Fortnightly*, XVII (March 12, 1936), 357–63.

many carriers will voluntarily surrender their certificates or permits owing to business failures and other reasons, the Commission may be in a position "to freeze" the present service structure or even in time to restrict the volume of service to some extent. While this is an interesting question for speculation, it was introduced at this point primarily to demonstrate that the Congress not only instructed the Commission "to preserve the inherent advantages" of motor-carrier service in the declaration of policy, but it also so wrote this very important substantive provision that the Commission must perforce be guided to a large degree by this mandate.

CONTROL OF RATES

While a public demand for governmental control of rail rates was primarily responsible for Congress enacting the Act to Regulate Commerce in 1887, there is no parallel explanation for the Motor Carrier Act of 1935. Motor-transport rates have been anything but excessive in recent years, and this fact is attested to by the reluctance of organized shipper groups to support this legislation during its long legislative history before Congressional committees. Nor has the typical motor carrier the opportunity which the rail carrier had fifty years ago to discriminate between shippers and places. Having a smaller proportion of fixed to variable costs, having little financial strength, and seldom having a monopoly over any part of his route, he is relatively powerless to discriminate or to "hold up" the shipper. Nevertheless, Congress has prescribed for interstate motor carriers the standard pattern of rail-carrier rate regulation to be found in Part I of the Act to Regulate Commerce and in state motor-carrier statutes.

Common carriers are required by Section 217*a* to file with the Commission, print, and keep open to public inspection, tariffs showing their individual and joint rates for transportation, and all services in connection therewith. Section 218*a* makes it the duty of contract carriers to file and publish schedules or, in the discretion of the Commission, copies of contracts containing their minimum charges and any rules or practices affecting the charges demanded. The filed rates of common carriers are to be their exact rates, the law specifically prohibiting them from charging "a

greater or less or different compensation" for their services. Contract carriers may charge greater or different rates than those filed with the Commission, but they may not charge less than the filed rates. The exact rates of common carriers and the minimum rates of contract carriers on file with the Commission cannot be changed except upon thirty days' notice of the proposed change, although the Commission may allow proposed changes to become effective upon fewer days' notice. All carriers were required to file their tariffs by March 31, 1936, to become effective on April 1, 1936.[43]

The Commission has the power to force common carriers of passengers to establish reasonable through routes with other such carriers, and to assess reasonable individual and joint rates and to establish equitable divisions of joint rates as between participating carriers. While it is the duty of common carriers of property to establish just and reasonable rates, it is optional for them whether they establish through services and joint rates. Both classes of common carrier may establish through routes and joint rates with rail and water carriers. Discriminatory rate practices are specifically prohibited.[44]

Another aspect of the rate control established consists of the positive powers given the Commission to approve and prescribe

[43] The requirement that tariffs be filed is one which will be burdensome to the many thousand small truck operators who have had little or no experience in building tariffs and who have been quoting rates freely as the competitive situation dictated. Hundreds of tariff bureaus, lawyers, so-called rate and other experts have already established themselves in business in response to the need which these operators have for assistance. By order of the Commission, effective on January 8, 1936, two tariff circulars, M.F. No. I and M.P. No. II, containing very simple rules and regulations governing the construction and filing of tariffs and schedules were prescribed. The Commission stated in these circulars that the tariff regulations may have to be amplified as experience dictates and teaches. The prescription of simple requirements demonstrates the desire of the Bureau of Motor Carriers not to burden the members of the industry any more than necessary at the beginning.

[44] The prohibition of discriminations or preferences is limited so as not to apply "to discriminations, prejudice or disadvantage to the traffic of any other carrier of whatever description" for the reason that motor carriers were afraid that rail carriers with their adequate legal staffs would claim discrimination against their customers and thus harass the motor carriers with litigation. This proviso constitutes another safeguard to the preservation of motor-carrier service.

the rates, classifications, rules and regulations, and other rate practices of the motor carriers. As in the case of rail carriers, the Commission is authorized, upon complaint or on its own motion, to enter into an investigation to determine whether any rate or rate practice in effect or proposed by a common carrier is or will be a violation of the law and of its rules and regulations. If, after hearing, the Commission finds any rate or rate practice is or will be "unjust or unreasonable, or unjustly discriminatory or unduly preferential or unduly prejudicial," it is directed to determine and prescribe the lawful maximum or minimum, or maximum and minimum rate or rate practice thereafter to be observed or to be made effective. However, with respect to contract-carrier rates, the authority of the Commission is more limited, since it has only the power to investigate any minimum charge effective or proposed to be made effective and, if it finds such charge contravenes the policy declared in Section 202*a*, it may prescribe such minimum charge as in its judgment may be necessary or desirable in the public interest.

The Commission is given authority, either upon complaint or its own motion, to suspend the operation of any rate of common carriers or minimum charge of contract carriers pending investigation to determine the lawfulness of the proposed rate. There is, however, one important limitation to the suspension power of the Commission. It has no power to suspend the initial schedules of rates filed by either common or contract carriers. This limitation safeguards the right of the carriers to originate the rate structure. On the other hand, once the rates are effective, the Commission may c ˈer them changed or prescribe new rates in their stead, but only after formal hearing.[45]

[45] The prohibition against suspension of rates initially filed has contributed to the interest shown in developing a suitable rate structure for the trucking industry immediately after the enactment of the Motor Carrier Act. The American Trucking Associations, Inc., at once set machinery into motion to establish rate committees in every state and region of the country to consider proposals and to work out a suitable rate structure for the various areas and natural divisions of the industry. Local trucking associations and prominent truck operators, particularly the large common carriers, also held meetings for this purpose. Moreover, the organized industrial shippers have taken a great interest in this problem, apparently desiring

Certain criteria are specified to guide the Commission in the exercise of its power to prescribe just and reasonable rates for common carriers. On the negative side, no consideration is to be given good-will, earning power, or the value of the certificate as evidence or elements of the value of the property of any common carrier in a rate proceeding. On the positive side, the Commission is directed to give consideration, among other factors,

> to the inherent advantages of transportation by such carriers; to the effect of rates upon the movement of traffic by such carriers; to the need, in the public interest, of adequate and efficient transportation service by such carriers at the lowest cost consistent with the furnishing of such service; and to the need of revenues sufficient to enable such carriers, under honest, economical, and efficient management, to provide such service.

It will be noted that these factors are consistent with, and serve to place emphasis upon, the principle laid down in the declaration of policy that the manner of administration of the Act must not suppress the proper development of the motor-transport industry. It appears that this principle is carefully safeguarded by the language of the key substantive provisions.

In prescribing minimum rates for contract carriers, the Commission is directed to "give no advantage or preference to any such carrier in competition with any common carrier by motor vehicle," which is inconsistent with the public interest; and, in favor of contract carriers, the Commission is directed to give consideration to the cost of service rendered by such carriers. The first criterion is not only in line with the provisions to be found in many state motor-carrier laws and the actions of the state commissions,[46] but it is in accord with the theory propounded by Mr.

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to have truck rates related to cost of service rather than to the value of service. There has been much discussion and controversy regarding the factors upon which the truck rate structure should be based. The shippers and many truck operators want a cost-of-service basis, believing that such a basis is better adapted to preserving the "inherent advantages" of motor-carrier service. Others believe the value of service the only practical basis owing to rail competition, and desire the use of the rail classification and rates equal or differentially under rail rates. Cf. recent issues of such publications as *Traffic World* and *Transportation Topics*.

[46] Cf. *Sen. Doc. 152* (73d Cong., 2d sess.), p. 185. The statutes of the states of Colorado, Connecticut, Georgia, Kansas, Kentucky, Maine, Massachusetts, North Dakota, Rhode Island, Tennessee, Texas, West Virginia, and Wyoming require

Eastman before the Senate Committee on Interstate Commerce. The second criterion is supported by the contract carriers themselves and by the shippers utilizing their services, who maintain that the contract carrier is in a position to operate more cheaply owing to its high load factor and lack of terminal expense. While both criteria are supported by strong arguments, no settled conviction can be found regarding the one that should be determinative in all cases.

It is clear that Congress has given the I.C.C. broad powers to regulate motor-transport rates. However, there is question as to whether the Commission can enforce these rate provisions. It would appear a herculean task to enforce even the filing of proper tariffs in an industry with so many small and widely scattered units without attempting to enter into investigations to test the lawfulness of the rates thus made effective by the carriers. A more difficult problem still, however, lies in enforcing the observance of filed rates and charges. The state commissions have not been very successful in this respect, although they have had an excuse in their lack of control over interstate rates in competition with the rates of intrastate carriers.[47] While the Commission will not have this difficulty to confront, it remains to be seen whether it can supervise the rate practices of the many thousands of motor carriers under its jurisdiction.

SECURITY FOR PROTECTION OF THE PUBLIC

While because of the competitive nature of the industry there are sound economic grounds for questioning the usefulness in the public interest of attempting to control by direct means either the supply of motor-carrier service, particularly truck service, or the rates at which it is offered to the public, there can be no gainsaying that the public interest demands regulation of the financial

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the rates charged by contract carriers to be the same or not less than the rates for common carriers for substantially the same service, and the Department of Public Service of the State of Washington by its order No. 22787, decided January 15, 1936, has prescribed this same rule.

[47] Cf. the remarks of Commissioner Frank P. Morgan of the Alabama Commission at the Forty-seventh Annual Convention of the National Association of Railroad and Utilities Commissioners, Nashville, Tennessee (*Proceedings* [1935], p. 155).

responsibility of motor carriers. This principle has been widely adopted by the various states, although there is little uniformity in the requirements specified by their motor-carrier statutes.

The Commission is directed by Section 215 of the Act to require of motor carriers proper evidence of their ability to pay any final judgment recovered against them resulting from bodily injuries or death resulting from negligent operation or for loss or damage to property of others. The Commission may, in its discretion, prescribe for common carriers reasonable standards of cargo insurance for the protection of the shippers and consignees.[48] While the principle of adequate financial responsibility is generally accepted, many motor carriers, particularly the small truck operators, are fearful that the Commission might adopt compulsory insurance limits so high as to discourage the small-scale operator from attempting to make a living in trucking, thereby curtailing the supply of motor-carrier service. Doubtless, the rail carriers

[48] On February 3, 1936, the Bureau of Motor Carriers issued its proposals with respect to financial responsibility to interested parties for suggestions and criticisms, and hearings upon them were held in Washington, D.C., on March 11 and May 12, 1936. With respect to passenger carriers there were proposed the following standards of insurance: for each bus having seating capacity under 13 passengers, public liability in the limits of $10,000 for one person and $50,000 for all persons in one accident and $5,000 property damage; 13–20 passengers, $10,000 and $75,000 P.L. and $5,000 P.D.; 21–30 passengers, $10,000 and $85,000 P.L. and $5,000 P.D.; and 31 or more passengers, $10,000 and $100,000 P.L. and $5,000 P.D. It was proposed that on each truck or trailer used for the transportation of property $10,000 for bodily injury or death to one person and $25,000 for bodily injury or death to all persons in any one accident, and $5,000 for damage to property be required. With respect to cargo security, it was proposed that common carriers must keep in force adequate insurance to cover and protect all property received for transportation at the full value of such property, except when transported under authorized "released rates," subject to a minimum of $750 for each ton of rated capacity. It is proposed that brokers shall file with the Commission a surety bond or other security in the amount of $5,000 to insure financial responsibility. To qualify as a self-insurer a financial statement must be furnished the Commission showing at least a $200,000 surplus or net worth.

Among the truck operators there has been much criticism of these proposals particularly of the cargo security and qualifications as a self-insurer. The American Trucking Associations, Inc., and the National Association of Motor Bus Operators have gone on record as opposed to these proposals.

and the large and well-established truck and bus lines would not regret such a result.[49]

SAFETY REGULATIONS

Another recognized need for federal regulation springs from the problem of promoting safety on the highways. Although the states, under their police powers, have been allowed to control the conditions under which interstate motor carriers might use their public highways, there has developed an irksome lack of uniformity in safety regulations of various states, and, furthermore, while most states have adequate regulations in their highway statutes, many have failed to make them effective with the result that the toll from traffic accidents continues upward.[50] Recognizing the strong public reaction against any unsafe practices on the part of those who operate buses and trucks on the highways, Congress has delegated wide latitude to the Interstate Commerce Commission to prescribe remedial regulations and to study the problem for the purpose of making recommendations to Congress for further legislation.[51]

The Commission not only is given power to prescribe the qualifications and maximum hours of service of employees and standards of safe operation and equipment in the case of common and contract carriers, but it may extend such regulation to private carriers if need is found.[51a] Specific authorization is given the

[49] The writer is conducting a study for the Washington Department of Public Service to ascertain why there is such a high turnover in the trucking industry, and, while the study is far from completion, it may be said that the insurance requirements are often cited by operators as a contributory factor.

[50] According to the National Safety Council, Chicago, "Motor vehicles killed and injured more people in 1934 than in any previous year. The death total of 36,000 is 15 per cent above 1933, when there were 31,363 deaths, and 7 per cent higher than 1931, which had the previous all-time high of 33,675 deaths" (*Accident Facts for 1935*, p. 22). While the trend for buses and trucks is more favorable than for passenger cars, there is still room for much improvement.

[51] On July 1, 1936, the Bureau of Motor Carriers issued its "Proposed Safety Regulations of the Interstate Commerce Commission Applicable to Motor Carriers Subject to the Motor Carrier Act, 1935." Public criticism of these proposals was equested.

[51a] The long hours of service of drivers of trucks frequently found in the for-hire trucking industry have been important contributory factors in many serious acci-

Commission to study this question thoroughly and to make such recommendations to Congress as it believes proper in the public interest. The value of the conservation of human life is so widely recognized that it is particularly to be hoped that the safety work of the I.C.C. will be productive of real results. In the past, there has been too much talking about highway safety, but not enough action.

CONTROL OF ACCOUNTS, RECORDS, AND REPORTS

The Commission is given adequate authority by Section 220 to prescribe the manner in which all accounts, records, and memoranda shall be kept and the length of time that these records shall be preserved. Representatives of the Commission are given access to all property used in rendering service and to all accounts, records, and correspondence kept by common and contract carriers and brokers. The Commission may also require annual, periodical, or special reports and prescribe the manner in which such reports shall be made. Billings and contents of shipments of common carriers of property are to be kept in accordance with Section 20 (11) of Part I, the section dealing with bills of lading requirements for rail carriers.[52]

REGULATION OF SECURITIES AND ORGANIZATION OF CONTROL

Despite the fact that the corporate form of business organization is not predominant in the motor-transport industry, and that, except for passenger carriers, there are very few securities offered the general public by motor carriers, Section 214 gives the Commission control over the issuance of securities by common

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dents on the highways. For a strikingly realistic account of the effect of this factor on highway safety, see the National Safety Council's publication, *Too Long at the Wheel* (1935).

[52] One of the greatest handicaps to effective administration of motor-carrier statutes has consisted in the lack of reliable information concerning the trucking industry. Lack of accurate knowledge of costs of service, traffic volume in ton miles and by commodities, load factors, and equipment factors, has forced commissioners to exercise much judgment in deciding rate cases. So far as truck operators are concerned, the experience of the state commissions seems to indicate that it is well-nigh impossible to obtain accurate financial, operating, and traffic reports from the small operators, the more numerous group, for the reason that a great many do not keep any accounts and others have only very rudimentary systems.

and contract carriers. This provision makes paragraphs 2–11, inclusive, of Section 20*a* of the Act to Regulate Commerce applicable to these carriers as well as to the rail carriers, excepting, however, carriers where the par value of the securities to be issued, together with the par value of those outstanding, does not exceed $500,000. This exemption will free most truck operators and many bus operators from the control exercised under this section. Briefly, the effect of this provision is to make it unlawful for common and contract carriers to issue any share of capital stock or any bond or other evidence of indebtedness until the Commission shall have given its approval, and then only to the extent authorized. The purpose of this control is to limit security issues to amounts necessary for the realization of lawful objects and proper performance of service to the public as a common carrier.

The Commission is given broad powers with respect to consolidations, mergers, and acquisition of control of motor carriers. While it is lawful for motor carriers to effect mergers, and for railroads, water lines, or others to consolidate with or acquire control of any motor carrier, approval of the Commission, after hearing, must be secured as prerequisite to carrying out any such action. An important limitation, however, is placed upon the right of a rail or water carrier to acquire control of motor carriers. The Commission is directed not to grant the required authority "unless it finds that the transaction proposed will promote the public interest by enabling such carrier other than a motor carrier to use service by motor vehicle to public advantage in its operations and will not unduly restrain competition." The purpose of this proviso is obvious, and it constitutes another instance where the language of the substantive provisions of the Act was so written as to make it necessary for the Commission to carry out the principles stated in the preamble of the Act. It should also be noted that, except where a rail, express, or water carrier or a person controlled by such carriers is the applicant, the provisions of Section 213 with respect to consolidation, merger, and acquisition of control do not apply where the total number of motor vehicles involved is less than twenty.

Accordingly, the Commission almost from the beginning has had control over the organization of the interstate motor-transport industry, since, except for bus lines, there have not developed huge organizations with public stock and bond issues either by means of the holding-company device or by any other method. This being the case, and having its experience with rail carriers in the background, the Commission should be in a position to prevent organization practices injurious to the public interest from arising in connection with the development of the motor-transport industry.

V. THE ADMINISTRATIVE PLAN

The striking feature of the administrative procedure prescribed by the Motor Carrier Act is the plan for the utilization of state administrative machinery in effectuating the new regulation. While federal motor-carrier regulation involves a centralization of governmental functions, it is tempered by the important place accorded the state commissions in the administration of the Act. Accordingly, this procedure is not only of interest to the industry itself, but should also be of general interest to students of public administration.

Stated briefly, the administrative plan consists of dividing the cases to be heard between the I.C.C. or its examiners and joint boards composed of state officials. While the Commission is always the ultimate authority in all matters, it is directed, when the matter at issue involves not more than three states, to refer to a joint board for appropriate proceedings matters involving applications for certificates, permits, or licenses; the suspension, change, or revocation of certificates, permits, or licenses; applications for the approval and authorization of consolidations, mergers, and acquisitions of control or operating contracts; complaints as to violations by motor carriers or brokers of the general regulations established; and complaints as to rates, fares, and charges of motor carriers or the practices of brokers. When the matter to be decided involves more than three states, the Commission has the option of referring it to the joint boards. In acting upon matters referred to them, joint boards are to be vested with the same rights, duties, and powers as are vested in members

or examiners of the Commission. Although orders recommended by a joint board are subject to the review of the Commission, they automatically become effective as orders of the Commission unless exceptions are filed within twenty days after service upon interested parties, or such other time as the Commission may decide upon, or unless stayed by the Commission itself.

The joint board to which a controversy is referred is to be composed of one member of each state involved. From a panel of names nominated by each state commission from its own membership or otherwise, or by the governor in the absence of nominations by such a commission, the Commission is directed to appoint any one as a member of this joint board.[53] When it is impossible to constitute a joint board, or if any joint board refuses or fails to act or is unable to agree within forty-five days after the matter is referred to it, or such other period as the Commission may authorize, then the matter is to be decided by the Commission as if it had taken original jurisdiction. In proceedings involving operations in foreign territory and a single state, or when only one state makes nomination, then the Commission may appoint three persons from such state to constitute a joint board.

The Commission is directed to prescribe rules and regulations to govern the meetings and procedure of joint boards, but the Act states that all decisions of these bodies shall be by majority vote. The Commission is also authorized to designate examiners from its own employees to advise with and assist the joint boards. The meetings and proceedings are directed to be held at such places as are convenient to the interested parties. All joint boards are to continue in existence to consider matters referred to them until dismissed by the Commission.

The *raison d'être* for this procedure lies in the nature of the economic organization of the motor-transport industry and in the desire of state commissioners to safeguard their powers so far as possible while still having the needed federal control of interstate motor-carrier service. The fact that the operations of motor

[53] The Washington Department of Public Service was requested to nominate one joint board representative and four alternates as a panel for consideration by the Commission.

carriers are essentially local in character justifies giving the state administrations an active part in their regulation. As previously pointed out, it is probable that not more than 25 per cent of all motor-carrier operations are interstate in character. Moreover, this industry, the trucking industry in particular, is composed of many small-scale enterprises with an average one-way route of less than two hundred miles. These conditions necessitate administration not from Washington but in the local areas where the service is rendered. Having an intimate knowledge of local conditions and problems, the state commissions are in a position to render great service to the Interstate Commerce Commission. No doubt this was the deciding factor in the adoption of this administrative system.

Of secondary importance was the political factor. State commissioners are reluctant to relinquish any part of their regulatory authority and the tradition has been for them to resist federal encroachment upon their power. In the case of the Motor Carrier Act, they were willing to give it their support on the condition that they be given important administrative functions. This was for the reason that experience had taught them that it was impossible to attempt to control intrastate carrier rates when competitive interstate carriers were permitted to operate without regulation. Although the plan was to a considerable extent a concession to political pressure, it is for the best that it is to be given a trial.[54] While state commissioners will have to submit to the ultimate authority of the Interstate Commerce Commission and, so far as their work as joint board members is concerned, will be reduced to the status of examiners for the Commission, they have gained much in having better conditions to deal with in connection with regulating intrastate service and in having an opportunity to give the Commission the benefit of their experience in interstate proceedings and the privilege of submitting recommendations as to the decisions to be entered in the final orders.[55]

[54] For a detailed discussion of the evolution of this administrative plan, of its advantages and disadvantages, and of its constitutionality, see Paul G. Kauper, "Utilization of State Commissioners in the Administration of the Federal Motor Carrier Act," 34 *Michigan Law Review* 37 (November, 1935).

[55] That the Commission will not be likely to disregard the findings and recommendations of the joint boards may safely be predicted in light of the fact that it has

Have the motor carriers, themselves, fared as well as the state commissioners in having their interests safeguarded so far as the administrative features are concerned? As previously stated, the motor carriers, particularly truck operators, fearful lest the Commission and its employees be "railroad-minded" owing to their long experience regulating rail carriers, advocated the Eastman bill to reorganize the Interstate Commerce Commission[56] in such manner as to insure the industry fair treatment. Although this bill did not receive the approbation of Congress, the Commission, nevertheless, has made a concession to the motor carriers in establishing as Division V a separate bureau, the Bureau of Motor Carriers, to have charge of the administration of the Act.[57] The key posts in this Bureau have been filled by men taken chiefly from outside the Commission's own ranks, and the Commission has been careful to select only men who have had extended experience with motor-transport problems and intimate knowledge of motor-carrier operations. Its procedure in organizing the staff of the Bureau of Motor Carriers gives no grounds for charging the Commission with "rail-mindedness."

VI. SOME ECONOMIC IMPLICATIONS OF FEDERAL REGULATION

The enactment of the Motor Carrier Act has converted the regulatory problem from the task of obtaining an enabling act to close the gap created by the *Buck* v. *Kuykendall* decision of the United States Supreme Court in 1925 into the task of securing effective regulation of the motor-transport industry. It now is

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in most cases accepted the recommendations of state commissions with respect to applications for certificates in extension and abandonment proceedings under the Transportation Act of 1920. See Martin L. Lindahl, "Cooperation between the Interstate Commerce Commission and the State Commissions in Railroad Regulation," 33 *Michigan Law Review* 338 (January, 1935).

[56] *S. 1635* (74th Cong., 1st sess.). This bill would provide the equivalent of a separate commission within the Interstate Commerce Commission for each form of transportation. Thus, there would be a railroad division, a water and pipe-line division, and a motor and air division.

[57] One of the reasons why this bill failed to pass lies in the opposition of the Commission as a whole to Mr. Eastman's proposal. See the statement of Frank McManamy, chairman of the Legislative Committee, Interstate Commerce Commission, before the *Senate Committee on Interstate Commerce, Hearings on S. 1629* (74th Cong., 1st sess.), p. 127.

the duty of the I.C.C. to attempt to make this Act effective. However, it is not at all certain that it will be possible to secure effective regulation in an industry composed of so many small units, so widely dispersed, and so completely subject to competitive forces. Assuming, however, that regulation can be made effective, speculation upon the economic consequences of this control measure is not idle or untimely. The sponsors of the Act expressed a firm belief that in operation it would do much toward solving the transportation problem by making it impossible for irresponsible carriers to operate; by improving working conditions in the trucking industry; by increasing the safety of operations on the public highways; by making it possible for shippers to know what rates their competitors are paying for necessary transport services; by increasing the profitability of motor-carrier operations and, thus, the ability of the carriers to serve the public satisfactorily; and by assisting rail carriers in getting back to an earning basis by preventing an oversupply of transport service. The Act is pregnant with possibilities such as these. Whether they will be realized is a question that cannot be answered until the future unfolds itself.

It is well to consider first the general public interest in the matter. While there is no complete agreement as to what constitutes the public interest, it is a safe presumption that the public is interested in having good and efficient service at the lowest rates necessary to enable carriers to serve. Under weak regulation or in the absence of business regulation there has been a phenomenal growth of motor transportation, both commercial and private, with the result that the public has enjoyed not only a greater variety of services but also lower transport rates as a result of increased competition. While these benefits have been attended by some disadvantages, such as financial irresponsibility of carriers and unsafe service in particular instances and the emergence of highway finance[58] and railroad problems, there can

[58] The question of whether the highway user is being subsidized by the general taxpayer has never been authoritatively answered, although there is being carried on much scientific study seeking a solution to this problem. For example, see the *Report of the Highway Cost Commission of the State of Washington* (January, 1935).

be little doubt but that this development has brought progress in transport methods. However, under regulation of a strong type will this progress continue or will regulation have a deadening effect upon the initiative of the motor carriers as it has upon the rail carriers? This significant question must not be overlooked when a lapse of time makes evaluation possible.

In analyzing this problem it should be remembered that Congress definitely stated in the declaration of policy that the "inherent advantages" of motor-carrier service must be preserved, and, as we have noted, the certificate and rate provisions are so written as to make it difficult for the Commission to depart from this policy. Nevertheless, it must be remembered that this legislation is a part of a definite program of the federal government to co-ordinate all transport agencies in an effort to deal with the railroad problem. Even if an effort is made to be absolutely fair to both agencies, and this is probable, there can be no gainsaying that the Commission's regulations with respect to filing proper tariffs and insurance policies, observance of safety of operations and hours of service standards, and the necessity of keeping proper accounts will reduce the attractiveness of the industry and deter many would-be operators from entering the business. The experience with state regulation, ineffective as it has been because of unregulated interstate carriers, justifies this conclusion. It would appear, therefore, that it is inevitable that some restriction in the supply of motor-transport service will result from the operation of the Act, if the "domestic tranquillity" of which Mr. Eastman spoke before the Senate Committee is to be attained. Whether such restrictions as may be brought about will lessen competition sufficiently to exert any appreciable effect toward increasing the rates for motor freight service can only be conjectured at this time. Nevertheless, this is one of the economic problems having wide significance to the general public, and one which merits study and serious consideration.[59]

[59] The great interest being shown currently by large shippers and shipper organizations in this matter is indication of their fear that the Commission might relate motor-carrier rates to rail rates in such way as to force part of the motor traffic back to the rails on a higher cost-to-the-shipper basis. While this possibility exists,

Then there is the possibility that one of the effects of federal control will be to put truck operators in a "strait-jacket" by limiting their routes and the scope of their operations, and by making it necessary for them to seek the permission of the Commission before they accommodate their shippers with innovations in service. It is a commonplace that one of the greatest advantages of motor-carrier service has been its flexibility. Truck operators, especially, not being tied to a fixed set of rails as are the rail carriers, have been willing to go anywhere at almost all hours of the day and night at the convenience of the shipper, so long as there has been a load to be carried within the general range of profitable operations. Compared with the infrequent rail schedules, the incompleteness of the rail service in the past, and the relative slowness of delivery time, there is no cause for wonder at the fact that the motor-transport industry has found a definite place in the "transport sun." If holding the operations of motor carriers to circumscribed routes and schedules may bring benefits to the shippers depending on a regular common-carrier service, there is a real reason to question any policy which would tend to restrict greatly the freedom of the truck operator to adapt his service to shippers' needs. The many thousand operators who render service on an anywhere-for-hire basis serve the needs of many communities and persons who have insufficient tonnage to warrant regular service. When it was necessary to depend on rail carriers solely, these communities and persons had to furnish their own service as best they could and, usually, at a rather high cost. Isolated and rural communities should have the benefit of fresh supplies, rapid service, a means to ship out their products, and of rapid turnovers owing to not having to keep large inventories on hand. Large communities have no inalienable right to a monopoly of these advantages.

Second, there must be considered the probable effects of this legislation upon the regulation of intrastate commerce by motor vehicle. Since the state commissions advocated this measure for

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it is well to remember that the costs of shippers undertaking to operate trucks as a plant facility on a private-carrier basis set upper limits to the rates which could be secured and this fact no doubt will be recognized by the Commission.

ten years, it would seem a reasonable presumption that federal regulation will strengthen their control over intrastate carriers and render their work less futile. Co-operation between the state commissions and the I.C.C. will in the future prevent such conditions as unregulated interstate carriers cutting the rates filed by, or prescribed for, the intrastate carriers and the voidance of regulation by intrastate carriers through the use of such subterfuges as crossing state lines for the sole purpose of clothing their operations with an interstate character, which have contributed much to the inability of state commissions to make their rate regulations effective. Moreover, since the Supreme Court of the United States has denied the power of state commissions to regulate rates of interstate carriers or to deny these carriers authority to operate in interstate commerce, the state commissions stand to gain added powers through their participation as members of joint boards in the deliberations of the Commission concerning interstate operations. In addition to these effects, federal regulation may exert a wholesome influence upon the kind of work done by the state commissions, owing to closer association with the high standards of work and the skilled personnel of the more professionalized I.C.C. Furthermore, in the movement toward uniformity of state regulations, especially of traffic regulations, the I.C.C. will doubtless be in a position to act as the leader.

Third, there is the question of the effects of the Act upon the regulated carriers themselves. Owing to the "grandfather clause" provision and the time which it will necessarily take for the Commission to get under way owing to the magnitude of the problem of administering the Act, the necessity of building a new staff under civil service regulations, and lack of adequate appropriations at the very peak of its work, it is likely that the Act will have little effect upon the industry during the first year of operation, and possibly during a much longer period if one can judge from the length of time that it took to make railroad regulation effective. It is true that the carriers are finding it necessary to spend considerable time in filing necessary applications and tariffs and in studying the requirements proposed or made effective, but, beyond this effect, most carriers will doubtless carry on as when

unregulated for a considerable period of time. As the Act becomes effective, however, this situation will change.

Federal regulation may be expected to create conditions favorable to higher earnings in the motor-transport industry, particularly in the trucking industry. In the first place, internal competition will doubtless be placed upon a fairer basis, since all operators will have to observe the hours of labor, insurance, safety of operations, and tariff standards which the Commission will eventually make effective. Then, too, as previously indicated, there will probably be some restriction in the supply of motor-carrier service relative to the demand. While improved competitive conditions may not change the level of rates appreciably, a stabilizing influence will have been exerted, which, together with improved load factors, should be reflected in the income statements of the carriers. It is also possible that the tendency toward the development of larger units of business under regulation will lower the costs of rendering service by improving load factors and through the application of more efficient and advanced business methods.[60] Of course, not all common carriers would share equally in any increase in earning power which might accompany regulation, for many of the smaller ones will find the burdens of regulation so oppressive as to outweigh any benefits which might otherwise accrue.

Moreover, under regulation it is likely that commercial motor transportation will tend to lose its "little man" characteristic. Already there are definite indications pointing toward a growth of large trucking lines, and the time is not far distant when there will be regular transcontinental truck service just as there are now transcontinental bus lines rendering very satisfactory service. With "Wall Street" reported more favorably inclined toward

[60] Consolidation of motor-truck companies into large systems was predicted by Charles E. Cotterill, a well-known commerce counsel, in an address before the Metropolitan Traffic Association of New York, January 9, 1936 (*Traffic World*, January 18, 1936). He is reported to have said, "Already there is taking place throughout the country a significant amount of approach to the better organized and operated trucking companies by numerous of the smaller irresponsible concerns seeking the privilege of being bought out or otherwise taken under the protective wing of the responsible concerns which have welcomed and will find no material difficulty in complying with the new law."

financing enterprising truck operators, consolidation and merger should proceed rapidly under effective federal regulation. The railroads, too, if permission is granted by the I.C.C., may be influential in this development by purchasing competing trucking companies on the theory that it is better to utilize this agency than to attempt to obstruct its development any longer. Should this happen, the "national transportation systems" envisioned by some economists may not be long in developing. Accordingly, as in many other industries in recent years, the opportunity for the man with a small amount of capital or credit, but with business sagacity, to develop his own business will be narrowed by the ever advancing avalanche of "big business." Those who believe fundamentally in decentralization of business will doubtless have cause to be concerned with this probable consequence of federal regulation of the trucking industry.

It would seem almost a certainty that labor will stand to gain better working conditions under federal regulation of motor transport. In prescribing the maximum hours of service for employees, the Commission doubtless will rule out the long working days which have been a factor contributing to the lack of safety which drivers often experience in their work. Although many carriers, the larger ones in particular, voluntarily limit the hours of service of their drivers to a reasonable maximum, it is a well-known fact that others force their drivers to remain behind the wheel for ten, twelve, and, in extreme cases, eighteen consecutive hours. On the other hand, any curtailment in the supply of motor-carrier service under the Act would probably reduce the employment opportunities in the industry. Whether it is better for labor to have more jobs available for the hordes of men who desire to make a living for themselves and their families or to have better working conditions and higher wages for those who are fortunate in having work is a question about which there has been much controversy. It is, however, one meriting consideration as the Commission undertakes to administer the Motor Carrier Act.

Fourth, there are to be considered the effects of federal regulation of motor carriers on railroad earnings. Many rail-carrier executives and others have argued that if the I.C.C. were to con-

trol motor carriers as it does rail carriers, then the latter could compete favorably for certain kinds of traffic which have been lost to the trucks. Although there is the possibility that rail transportation may gain some competitive advantages, it would appear not to be the purpose of the Act to suppress any proper development of motor-carrier service for the benefit of the railroads. Moreover, it is generally agreed by those who have studied the matter that the difficulties of the railroads during recent years have been due more to the reduced volume of traffic incident to restricted production and trade in the depression than to the competition of motor carriers. Thus, although the railroads may derive some benefits from controlled competition and stabilized rates and may find it profitable to acquire trucking lines to make their service more attractive to shippers, it is too much to expect that they will find in federal regulation of motor carriers the answer to their difficulties. Doubtless, a genuine economic recovery and the reduction of wastes in rail organization and management would contribute far more toward finding a solution to the railroad problem.

It is premature to pass judgment upon this piece of legislation as a device to cure the ills which it aims to eradicate. Since the motor-transport industry presents problems *sui generis*, no parallel can be found unequivocally in the experience of the I.C.C. with railroad regulation. While time may demonstrate that federal regulation of the kind contemplated in the Act is feasible, one cannot but be soberly impressed with the magnitude and the complexity of the functions devolving upon the new Bureau of Motor Carriers.

A COMPARISON OF INDUSTRIAL GROWTH IN FRANCE AND ENGLAND FROM 1540 TO 1640. II

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SALT-MAKING and glass-making each employed several thousands of hands in France and England at the beginning of the seventeenth century. The inhabitants of the town of Berre in Provence, where nearly all the grown men were salters, numbered more than three thousand in 1588.[1] Along the Atlantic coast, in Poitou, Aunis, and Saintonge, and especially in the Bay of Bourgneuf, there were thousands of peasants who combined work at the salt marshes with their husbandry. Nearly a thousand men found employment in Charles I's reign at the great salt works at the mouth of the Tyne, and lived with their families in hovels near the furnaces, in the midst of "such a cloud of smoke as . . . . you cannot see to walk."[2] In 1615 there were said to be about twenty-five hundred *gentilshommes verriers* in the various provinces of the French kingdom,[3] without counting the common laborers, who performed all the rougher and more laborious tasks at the ovens and brought their masters food and wine which they ate sitting near their work, according to an ancient and well-established ritual.

Shipbuilding had numerous ramifications; for the sails and ropes, the nails and anchors, and even the masts and the planks for the hulls were frequently prepared in the scattered shops of various craftsmen before they were assembled in the shipyard, with its cranes for hoisting timbers into their places, and its launching ways down which the partly finished vessels could slide

[1] E. Sue, *Correspondance de Henri de Sourdis* (Paris, 1839), III, 311.

[2] J. U. Nef, *The Rise of the British Coal Industry* (London, 1932), I, 176, 178 n. There were said to be 222 pans, 180–90 of which were usually in operation; and four men ordinarily worked at a pan.

[3] P. Boissonnade, *Le socialisme d'état, 1453–1661* (Paris, 1927), p. 234.

from their stocks into the water. In both France and England the laborers engaged in the various branches of shipbuilding outnumbered the workers in glass; they certainly outnumbered the salters in England and possibly even in France.

All three industries deserve a larger place in history than has been accorded them. Their rapid growth played a part in the early English industrial revolution; for in England the factory form of enterprise had become common in all of them before the Civil War. Whether we judge by the number of workers they employed or by the capital invested, especially in England, in the workshops and auxiliary buildings, the furnaces and cauldrons, the machinery, the raw materials, and the draft animals, they should be ranked among the leading industries of early modern times.

Their place, nevertheless, was secondary to that of another group of industries which, with one exception, have received more attention from historians. The majority—probably the great majority—of all the industrial workers of England and France earned their living in the mining and metallurgical industries, the textile manufactures, and the building trades. Any comparison between the growth of industrial production in England and France from 1540 to 1640, and between the volume of output in the two countries at the end of this period, must rest mainly upon a study of these industries.

V. THE MINING OF COAL

In England the output of all the principal industries was growing fast during the late sixteenth and early seventeenth centuries. The growth was most remarkable in mining. This was due primarily to the phenomenal expansion in the demand for coal fuel in heating, cooking, and manufacturing. Before the Reformation coal had been used hardly at all for domestic fuel, except by poor people in places where the seams outcropped. Elsewhere there was no market for it except among smiths and limeburners. Even as late as 1564 the shipments recorded in the customs records for Newcastle, at that time the only coal port of any importance in the kingdom, amounted to only 32,951 tons. Seventy years later

they had increased to about 452,000 tons. Sunderland, a port with a negligible trade in coal when Elizabeth ascended the throne in 1558, shipped 69,133 tons in 1634. The traffic from Chester and Liverpool grew from less than 1,000 to more than 12,000 tons during the same period; that from South Wales increased nearly tenfold. In every county which had mines there was a feverish interest in the discovery and the development of coal resources, and so great was the need for the new fuel, that coal-finders wasted their time boring for it in counties where it was not to be found. Many mining enterprises each with scores of laborers, and more than a dozen with over a hundred, were in operation on the eve of the Civil War. Adventurers poured their own capital and that of their creditors into pumping engines and adits to drain their new collieries, with an abandon which sometimes landed them in debtors' prisons.[4]

The annual output of coal in the whole of Great Britain, probably less than 200,000 tons when the monasteries were dissolved, exceeded 1,500,000 tons a century later.[5] The rate of increase in production was even more rapid during the reigns of Elizabeth and James I, between 1558 and 1625, than in the traditional period of the Industrial Revolution from 1760 to 1832.[6] By the reign of Charles I coal had been widely adopted as fuel by the salt-maker, the glass-maker, the shipbuilder, the steel-maker, the wire-drawer, the saltpeter- and gunpowder-maker, the brewer, the sugar-refiner, the soap-boiler, the alum-maker, the dyer, the

[4] Nef, *op. cit.*, I, 21; II, 380; I, 53, 76–77; II, 72, 140 n., 66 ff.

[5] No doubt the output in the thirties of the sixteenth century was somewhat less than in the fifties, when I have estimated it at 210,000 tons (*ibid.*, I, 19–20). In the thirties of the seventeenth century more than 500,000 tons were shipped from Durham and Northumberland in normal years for trade, nearly 100,000 tons were burned in the local salt manufacture, and probably an additional 150,000 tons in glass-making, metal-working, and other local industries, and in domestic fires (*ibid.*, pp. 36, 208, and *passim*). It is improbable that as much as 50 per cent of the British output was ever produced in Durham and Northumberland (*ibid.*, p. 23).

[6] Cf. Nef, *op. cit.*, I, 123–24, and A. P. Usher, in *Quarterly Journal of Economics*, XLVIII (1933), 177–78. Between 1540 and 1640 output probably increased at least eightfold, between 1740 and 1840 approximately sevenfold, from about 5,000,000 tons to something like 35,000,000 tons (Nef, *op. cit.*, II, 357; J. H. Clapham, *An Economic History of Modern Britain* [Cambridge, 1926], p. 431). In the earlier period most of the growth came after 1560, in the later period after 1760.

hatmaker, the brickmaker, and almost every manufacturer except the smelter, who converted ore into metal. Families in every part of England had replaced wood and charcoal by coal in their cooking and their laundry work. The iron grate with its coal-burning fire had become the center of domestic life, not only in the neighborhood of the coal fields, but in London and most provincial towns.

No domestic practice marked off English from continental, and particularly French, life more sharply than the use of this newly adopted fire of coal. During the reign of Louis XIII one could have visited the house of any poor man or rich man in Paris or any other French town, one could have surprised the peasants in nearly all their village homes, even in provinces where coal outcropped, without finding coals in any hearth or stove. French visitors to England sometimes wondered how people could work and eat and rest amid the suffocating fumes from this base mineral. They were equally astonished by its widespread use in manufactures. At home, they knew, it was burned, save for a few rare and unimportant exceptions, only to calcine limestones and to forge certain metal wares.

For several centuries limeburners and smiths had employed coal locally to a small extent in those French provinces where the seams outcropped. During the sixteenth and early seventeenth centuries they used it more frequently and in larger quantities, and its use sometimes spread among limeburners and smiths outside the area of the actual diggings. By 1578, and probably somewhat earlier, packhorses began to carry part of the coal from some small pits near Alais, in the Cévennes, down through the hills to limeburners in Nîmes, thirty miles to the south.[7] Coal from Rive-de-Gier, in Lyonnais, was shipped in increasing quantities up the Rhone to Lyons, a distance of some twenty miles. According to an *intendant*, who probably exaggerated, between 30,000 and 40,000 tons were consumed annually by the middle of the seventeenth century in this great city,[8] with its sixty thousand or sev-

[7] A. Bardon, *L'exploitation du bassin houiller d'Alais* (Nîmes, 1898), pp. 15, 19.

[8] L. J. Gras, *Histoire économique générale des mines de la Loire* (St. Etienne, 1922), p. 156.

enty thousand inhabitants, its rapidly multiplying silk looms, its bankers and its merchants who, together with those of Vienne, controlled the steel supplies of Dauphiné.[9] Lyons provided the most important market for coal in the whole of France. But there was also a growing demand for it at towns along the Loire. Local traders built a small storage-house at Decize in Nivernais, conveniently situated for loading coal from the growing colliery of La Machine, and between 1560 and 1590 little boats began to move the fuel downstream as far as Gien and Orléans, and up the river Allier into Bourbonnais, to the thriving town of Moulins,[10] possibly to serve the cutlers whose wives besieged the traveler at his inn with their husbands' wares, if they had not already waylaid him on his arrival at the city gates.[11] The religious wars interfered with the progress of most industries, but, especially at St. Etienne in Forez, they stimulated the manufacture of arms, and indirectly, as coal was used there to some extent by smiths in forging weapons, the working of coal. The place grew from a medieval village, with a few hundred people, into a thriving town, with several thousands.

The increasing use of coal by smiths and limeburners during the late sixteenth and early seventeenth centuries explains the increasing activity of local peasants in digging for it in many new spots in several provinces. Tiny enterprises, generally employing less than half-a-dozen hands but in a few cases a dozen or more, multiplied in the Cévennes, in Provence, in Nivernais, in Anjou, in Forez, and especially in Lyonnais.[12] In the Cévennes leases of the

[9] Cf. J. Godart, *L'ouvrier en soie* (Lyons, 1899), pp. 19–20; J. B. Giraud, "Les épées de Rives," in *Documents pour l'histoire de l'armement au Moyen Age et à la Renaissance* (Lyons, 1904), II, 237–46.

[10] P. Destray, "Les houillères de La Machine au XVI[e] siècle," in J. Hayem, *Mémoires et documents pour l'histoire du commerce et de l'industrie* (4th ser.; Paris, 1916), pp. 177–82. Coal mining in Bourbonnais itself was of negligible importance until the eighteenth century (S. Claudon, "Etude sur les anciennes mines de charbon en Bourbonnais," *Bulletin de la Société d'Emulation et des Beaux-Arts du Bourbonnais*, VIII [1900], 47–48, 198).

[11] Camille Pagé, *La coutellerie depuis l'origine jusqu'à nos jours* (Chatellerault, 1896), I, 84–85.

[12] Bardon, *op. cit.*, pp. 13–42; *Inventaire des archives départementales*, Basses Alpes, B. 1812, 2010, 2214; Destray, *op. cit.*, pp. 162 ff.; O. Couffon, *Les mines de*

same mines at different dates show that the rents paid increased a good deal more rapidly than the value of money fell, particularly during the last half of the sixteenth century.[13] The proprietor of a mine at Dauphin, a tiny village in the hilly country near the river Durance in Provence, sold about 500 tons of coal in 1603 to one buyer for use in smith's work at Manosque, a small town some five miles to the south.[14] Most French mines were still so shallow that drainage had not become a problem. But at La Machine, according to Guy Coquille, the jurist and historian of Nivernais who died in 1603, large sums were spent at certain seasons in pumping out water.[15]

Although a marked increase evidently occurred in the production of coal in central and southern France, progress was slight compared to that in every English county where coal was mined. Apart from Forez, Lyonnais, and Nivernais, there was no French province which produced a substantial volume of coal in the seventeenth century. In Anjou, according to a local modern authority, the output in 1600 was only some 2,000 tons,[16] about a fifth as much as was then obtained from a single colliery in southern Lancashire with nothing but a local demand for its produce in Manchester—a place at that time of hardly more than four thousand or five thousand people.[17] In Bourbonnais the output was even smaller than in Anjou,[18] and it could not have been much greater in the Cévennes or even in Provence, where coal was dug in several districts.[19] The annual production of the whole

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charbon en Anjou du XIV^e siècle à nos jours (Angers, 1911), p. 564; L. J. Gras, *Historique de l'armurerie stéphanoise* (St. Etienne, 1905), pp. 2–3; L. J. Gras, *Histoire des mines de la Loire*, pp. 155–56.

[13] Bardon, *op. cit.*, pp. 23, 42.

[14] *Inventaire des archives départementales*, Bouches-du-Rhône, B. 3444.

[15] *Histoire du pays et duché de Niversnois* (2d ed.; Paris, 1622), p. 353.

[16] 76,204 bushels (Couffon, *op. cit.*, p. 564).

[17] Nef, *op. cit.*, I, 64; A. P. Wadsworth and J. de L. Mann, *The Cotton Trade and Industrial Lancashire* (Manchester, 1931), p. 509.

[18] Cf. Claudon, *loc. cit.*

[19] H. de Gerin-Ricard, "Mines et mineurs autrefois et aujourd'hui," *Société Statistique de Marseille*, XLVII (1906–7), 217, 251 ff., 308; *Inventaire des archives dé-*

French kingdom at the end of Louis XIII's reign could hardly have much exceeded that at the beginning of the eighteenth century, when a reasonable estimate would be under 100,000 tons.[20]

In the reign of Charles I, England, with about a third the population of France, produced nearly fifteen times as much coal.[21] The English coal-mining industry dwarfed the French to an extent never equaled since the middle of the eighteenth century. Compared with the "mountains" of coal which astonished travelers saw piled beside the pits in some English counties, the mines of France, except those at Rive-de-Gier and La Machine, seemed little more than ant hills.

VI. THE SMELTING OF ORES

The progress of deep mining in England had made the problem of drainage so serious that thousands of pounds in seventeenth-century money, worth perhaps five or six times that of our own day, were frequently spent by a single enterprise on adits, and on pumps driven by horse, or, less frequently, by water power. The pumping machinery was costly to operate. It was ineffective for raising water more than a hundred feet at a single flight. Inventors were busy trying to improve it. They were experimenting with steam as a force to substitute for horses and running water at the larger mines, which were often worked to depths of three or four hundred feet. While the search for improved drainage engines of all sorts was caused mainly by the expansion in coal mining, inventors were offering their new machines, which rarely accom-

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parlementales, Basses Alpes, B. 1812, 2214; Bouches-du-Rhône, B. 3444. In addition to the provinces mentioned in the text, coal was mined in small quantities in Burgundy, Champagne, Brittany, and the diocese of Albi.

[20] Nef, *op. cit.*, I, 126. My estimate is based on the reports made in 1709 by the *intendants* on the condition of French coal mining. The industry was seriously depressed at this time; for the output in Forez and Anjou was said to be a great deal less than it had once been (A. M. de Boislisle, *Correspondance des contrôleurs généraux* [Paris, 1897], Vol. III, No. 496). It is possible that somewhat less coal was being produced in France at the beginning of the eighteenth century than in the reign of Louis XIII.

[21] See above, p. 507. The annual output of England and Wales, without Scotland, was undoubtedly less than 1,500,000 tons.

plished what was claimed for them, to adventurers in ore mines as well as to adventurers in collieries.

Ore mining, like coal mining, had come to be carried on at greater depths in the late sixteenth and early seventeenth centuries than in the past, mainly because of an increase in the demand for the product.[22] The market for metal in England might have grown scarcely less rapidly than the market for coal, had a technique been devised to make possible the substitution of the new fuel for charcoal in the furnaces, forges, and ovens where metals were extracted from their ores.[23] For England was confronted with a timber crisis. The price of firewood rose between 1540 and 1640 nearly three times as much as the level of general prices.[24] As some forty cords of wood had to be converted into charcoal to make one ton of bar iron,[25] and as the extraction of other metals from their ores was not much less spendthrift of

[22] This was not true in the case of tin mining. The tin mines were worked to greater depths in spite of a slight decline in the output of tin (cf. G. R. Lewis, *The Stannaries* [Cambridge, Mass., 1907]).

[23] The market for ores did not, of course, expand in exactly the same proportions as the market for metals. In iron-making the widespread introduction of the blast furnace (see below, p. 518) reduced the quantity of ore required to make a ton of iron from about five to something like three tons (cf. Rhys Jenkins, "Iron-making in the Forest of Dean," *Newcomen Society Transactions*, VI [1925–26], 47) and also brought about, at least at some furnaces in the Forest of Dean, the use, in place of fresh ore, of cinders which had gone to waste at the medieval bloomery forges. There was probably less improvement in the methods of smelting other ores. The proportion of lead ore mined to lead produced early in the seventeenth century was about two to one (*Star Chamber Proceedings* [Public Record Office, London], James I, 75/10). Copper-making was many times more spendthrift of ore than either lead- or iron-making. Even in the eighteenth century the proportion of ore mined to copper produced was between thirteen and twenty to one (Henry Hamilton, *The English Brass and Copper Industries to 1800* [London, 1926], p. 351; A. H. Dodd, *The Industrial Revolution in South Wales* [Cardiff, 1933], p. 167). Consequently the production of copper in substantial quantities, which began in Elizabeth's reign (see below, p. 514), partially offset the reductions, caused by improvements in the smelting process, in the proportion of ores mined to metals produced.

[24] Nef, *op. cit.*, I, 158.

[25] *Ibid.*, p. 193. For some inexplicable reason Thorold Rogers' figures suggest that the price of charcoal followed general commodity prices rather than the price of firewood (G. Wiebe, *Zur Geschichte der Preisrevolution* [Leipzig, 1895], p. 375). Such slight information as I have obtained independently concerning charcoal prices suggests that they rather followed firewood prices.

fuel, the costs of smelting, which might have fallen considerably as a result of improvements in technique,[26] were kept up. As early as 1606, when the iron-making industry of southeastern England had begun to suffer from the growing shortage of wood, plans were made to ship English iron ore and cinders to be smelted in Ireland, where the woods were thicker.[27] Before the Civil War metallurgical enterprise was discouraged everywhere in England and Wales. In many places smelting operations actually had to be abandoned.[28]

Notwithstanding this handicap, there was a remarkable increase in the production of all metals except tin. Calamine, the ore of zinc, which had not been dug in England, was discovered first in Somerset in 1566, then in Gloucestershire and Nottinghamshire; and these discoveries made possible the extensive development of a new manufacture of brass—an alloy of prepared calamine and copper.[29] The introduction of the brass-making industry was probably the chief cause[30] for the falling-off in the output of tin, because brass wares were substituted for those of bronze—an alloy of tin and copper. But brass and wire, made of brass or latten, were wanted for many other articles—such as pins and cards for the carding of wool—besides those formerly made of bronze. The growth in brass manufacture, together with the greatly increased demand for copper in various forms, especially the large kettles and boilers in which saltpeter and other products of the rapidly growing manufactures were made,[31] caused an expansion in the demand for copper which much more than offset the decline in the demand for tin.[32] Copper ore was smelted for the first time in England in more than negligible quantities, and by

[26] See above, n. 23.

[27] *Calendar of State Papers Domestic*, 1603–10, p. 306.

[28] Cf. Nef, *op. cit.*, I, 158–61, 193–95, 244; *Calendar of State Papers Domestic*, 1638–39, p. 276.

[29] For what follows concerning brass and copper see Hamilton, *op. cit.*, *passim*.

[30] For other causes see Nef, *op. cit.*, I, 166.

[31] Cf. Section IX in October issue of this *Journal*.

[32] The output of tin fell from about 900 to between 500 and 600 tons per annum during the century from 1540 to 1640 (Lewis, *op. cit.*, pp. 253, 255).

the middle of the seventeenth century calamine was wanted not only in the domestic brass manufacture, which had declined in importance since the reign of James I, but for export to foreign countries.[33] The two greatest joint-stock companies organized in connection with industry in the Elizabethan Age, the Society of the Mines Royal and the Society of the Mineral and Battery Works, were formed to exploit the newly found resources of copper ore and calamine and to convert these ores by a series of processes into copper and brass ingots, sheets, rods, and wire.[34] They had mines, smelting houses, and other small factories in a number of counties, and they employed several thousands of workpeople.

The manufacture of lead and iron, like the manufacture of tin, had employed many workmen even in the Middle Ages, but the output of lead and iron, unlike that of tin, increased greatly between 1540 and 1640. To judge from the increase in the number of miners employed, in the capital invested in mines, and in the royalties paid to local landlords, the production of lead ore and lead in Somerset and Derbyshire, the two chief lead-producing counties, grew several fold at the end of the sixteenth century and during the first two decades of the seventeenth.[35] In Charles I's reign the annual output of metallic lead in the whole country was estimated at about 12,000 tons, more than twenty-five times the output of tin.[36]

A comparison of the growth of metal production in France and England is possible only in the case of iron. But, if we are concerned with the volume of output, iron is much the most important metal to consider, because in both countries the tonnage of iron produced exceeded that of all other metals combined. Again, it is the most important metal if we are to show that the English

[33] For the progress of calamine production in Somerset see J. W. Gough, *The Mines of Mendip* (Oxford, 1930), pp. 213–15.

[34] Cf. W. R. Scott, The *Constitution and Finance of English, Scottish and Irish Joint-Stock Companies to 1720* (Cambridge, 1910–12), II, 383–429.

[35] Gough, *op. cit.*, pp. 112–15; *Victoria County History of Derbyshire*, II, 231, 233. Lead ore was also mined and smelted in Yorkshire, Durham, and various parts of Wales.

[36] Nef, *op. cit.*, I, 167. The "fother" of lead was equivalent to about a ton (*ibid.*, II, 375).

output of metals was forging ahead of the French, because it is chiefly in connection with iron that England's advantage is open to doubt.

While tin, lead, and copper ore were all mined in the French kingdom to some extent, the supplies of metal extracted from them were inadequate to meet domestic needs. A memoir on foreign trade, drawn up about the middle of the sixteenth century, indicates that France imported large quantities of tin, lead, and copper, and that the first two metals came mainly from England, whose shipments of metal to France apparently exceeded in value those of wool and woolen cloth.[37] A century later the positions of the two countries remained much the same. Some two decades after the English Civil War, in 1669, 1671, and 1672, tin, lead, and copper in various forms were still among the most important items in the incomplete records of imports kept by the French government. According to these records France was importing 845 *milliers de livres* of tin annually, or about 407 tons (at a time when the whole English output scarcely reached 800 tons);[38] she was importing about 2,700 tons of lead and about 605 tons of copper and copper wares, including a species of brass wire known as latten.[39] There is no way of determining what proportion of the

[37] Boissonnade, *op. cit.*, pp. 11–13. Cf. *Inventaire des archives départementales*, Bouches-du-Rhône, B. 3332, fol. 839.

[38] Lewis, *op. cit.*, p. 255.

[39] Archives Nationales (Paris), F^{12} 1834A. It was through the kindness of M. Georges Bourgin that I was able to get copies of these interesting documents. The figures they contain somewhat understate the actual imports of tin, lead, and copper, for two reasons. In the first place, they do not cover the whole of France. They include the imports into all provinces which formed part of the central customs division known as the *cinq grosses fermes* and also the imports into the *provinces réputées étrangères*, with the exception of Brittany and Dauphiné. As very little metal, except possibly iron from Savoy, was imported into Dauphiné, the only important omissions were Brittany and the few *provinces à l'instar de l'étranger effective*, most of which did not belong to France until after 1640. In the second place, some of the metal brought into the territory covered by the returns probably escaped entry, either because of smuggling or because of corruption on the part of the customs officials.

While the returns include some French commodities, such as soap from Marseilles, which paid duties on entering the area of the *cinq grosses fermes* or at the toll stations of Valence and Lyons (cf. E. F. Heckscher, *Mercantilism* [Eng. trans.; Lon-

imports of lead and tin was English, but it must have been considerable.[40] Just before the Civil War, England exported about 4,500 tons of lead annually[41] and a good deal more than half her yearly output of tin.[42]

While calamine was not included in the seventeenth-century records of French imports, we have no evidence of any discoveries of this ore in France before 1640 to match those which in England permitted the establishment of a great brass manufacture. There were certainly no French supplies of calamine as abundant as those produced in the Duchy of Limbourg by the celebrated mines of Moresnet. The monopoly enjoyed by these mines in supplying the surrounding countries was strengthened by an order of the King of Spain in 1590, that no brass or copper wares made with any other calamine should be sold even in those parts of the Low Countries—Lille, Douai, and Orchie—which were eventually to become part of France.[43] It was only in the case of iron ore that French resources were equal or superior to English.

During the reign of Francis I iron-making probably occupied a place of greater importance in France than in England. In both countries the ore was smelted in many regions mainly for local consumption. Down at least to 1540 the smelting operations were apparently conducted on a larger scale in several French provinces than in any part of England, with the possible exception of Sussex. Genuine blast furnaces put in an appearance at the end of the fifteenth century, if not before, in Burgundy and Champagne, at

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don, 1935], I, 98–105), it is plain that virtually all the entries of tin, lead, and copper were of foreign origin.

I have reduced the figures given in the returns to tons on the assumption that the *livre* was equivalent to 0.49 kg. (See below, n. 59).

[40] A substantial portion of the wrought copper came from the Spanish Netherlands, and was probably produced in the valley of the Meuse, at and around Namur.

[41] The English exports of lead increased from 2,900 "fothers," or nearly 3,000 tons, during the year ending at Michaelmas, 1593, to about 4,600 fothers annually on the eve of the Civil War, when the output was estimated at 12,600 fothers (*Calendar of State Papers Domestic*, 1591–94, p. 556; *ibid.*, 1636–37, p. 305).

[42] Lewis, *op. cit.*, pp. 55–56.

[43] H. Pirenne, *Histoire de Belgique* (3d ed.; Brussels, 1923), III, 254; Archives du Nord (Lille), B. 1835, fols. 34–35.

Laigle near Alençon, and perhaps in Nivernais.[44] The new process of iron-making was probably introduced into England from France.[45] But blast furnaces were still scarce in France as well as in England, where we know for certain of only three until after 1540.[46] The French iron-making industry derived its advantage from the steadily increasing use, since the thirteenth century or earlier, of water power for driving the hammers and bellows at the older type of mill where wrought iron was made directly from the ore. By the beginning of the sixteenth century, if not before, water power had come to be almost universally used in the manufacture of iron in Dauphiné, the upper Marne valley, and many other parts of the French kingdom.[47] In England, where the annual output of the average bloomery forge at the beginning of the sixteenth century was probably about twenty tons,[48] water power was less generally employed. French forges were usually larger than English and were staffed by more workmen. They generally produced a somewhat greater quantity of iron.

Between 1540 and 1640 a fundamental change took place in iron-making all over Europe with the widespread adoption of the blast furnace,[49] which generated a greater heat than the older forges and, by reducing the ore to a liquid form, made it possible to extract more metal. The pig iron obtained at these furnaces was carried to a forge, where it was again heated and hammered into bars. It became cheaper to produce iron by two processes instead of one, and both the new furnaces and the forges were

[44] Ernest Straker, *Wealden Iron* (London, 1931), p. 40; Bulard, "L'industrie du fer dans la Haute-Marne," *Annales de géographie*, XIII (1904), 232; M. Leroux, *L'industrie du fer dans le Perche* (Paris, 1916), p. 59; A. Massé, *Monographies nivernaises* (Nevers, 1913), II, 358.

[45] Straker, *op. cit.*, p. 47.

[46] J. U. Nef, "Note on the Progress of Iron Production in England, 1540–1640," *Journal of Political Economy*, XLIV (1936), 398.

[47] T. Sclafert, *L'industrie du fer dans la région d'Allevard au Moyen Age* (Grenoble, 1926), pp. 46–47, 49–50, 63–64; Ernest Chabrand, *Essai historique sur la métallurgie du fer et de l'acier en Dauphiné et en Savoie* (Grenoble, 1898), pp. 19–20, 22; Bulard, *op. cit.*, p. 232.

[48] Nef, "Note on Iron Production," p. 402.

[49] Cf. Ludwig Beck, *Die Geschichte des Eisens* (2d ed.; Braunschweig, 1891), I, 781.

much larger establishments with heavier and more expensive machinery than the mills which they superseded.

An idea of the growth in the output of iron in England can be obtained from records of the progress of the blast furnace. By the reign of Charles I the new furnaces, unknown except in south-eastern England before the dissolution of the monasteries, had spread to at least fourteen counties. There were probably between one hundred and one hundred and fifty of them in blast, and nearly twice as many large forges for converting the pig iron into bars. The national output of iron seems to have grown at least as rapidly as that of lead. It increased several fold—perhaps fivefold or even more—between 1540 and 1625. When Charles I succeeded to the throne, between 20,000 and 30,000 tons of bar iron were probably produced annually at the new forges, besides the wrought iron still made directly from the ore by more primitive methods and besides the finished articles, such as fire backs, cannons, and grave slabs, which were cast into final form at the blast furnaces.[50]

Between the death of Francis I and the accession of Louis XIV, there was nothing comparable across the Channel to the feverish and unprecedented expansion of the English iron-making industry from 1540 to about 1625. While the output of iron grew in central France, particularly during the religious wars when the demand for arms increased, mills were decreasing in number in the Cévennes and in Champagne, where a revival of the manufacture at the beginning of the seventeenth century was cut short in the thirties by the invasions of foreign armies.[51] In Dauphiné, possibly the most important iron-producing province of France, the progress of the industry in the late sixteenth and early seventeenth centuries was no more striking than it had been in the fourteenth century and again at the end of the fifteenth.[52]

The new process of iron-making made less rapid progress in

[50] Nef, "Note on Iron Production," pp. 401, 403.

[51] Bardon, *op. cit.*, pp. 36–37, 41; Bulard, *op. cit.*, pp. 234–35.

[52] Sclafert, *op. cit.*, pp. 103, 107; Giraud, *op. cit.*, pp. 198 ff. Boissonnade speaks of sixty-eight forges near Rives in 1660 (*op. cit.*, p. 232), but these were not, as he apparently supposed, iron-making forges but small mills for working iron into steel.

France than in England. Blast furnaces had been fairly generally adopted by the middle of the seventeenth century in the Perche and in Champagne and Nivernais, where they had been introduced before 1540, and also in Dauphiné, where they were apparently a novelty.[53] But they had not penetrated at all to at least two iron-making areas of some importance, those of the Cévennes and the Comté de Foix.[54]

Not only was the blast furnace making slower headway in France than in England, but it was apparently increasing more slowly in size. While the scale of iron-making operations had been greater in France at the time of the Reformation, the positions of the two countries seem to have been reversed during the hundred years which followed. By the middle of the seventeenth century there were probably furnaces in the Midlands which produced as much as 700 tons of pig iron in a year. The average output of an English blast furnace in the thirties probably exceeded 200 tons[55] —about ten times as much iron as had been made by the old-fashioned bloomery forge at the beginning of the sixteenth century. Our knowledge of the output of French mills is meager. But in Nivernais, which became one of the most important iron-making provinces in the seventeenth century, the first large blast furnace was built in 1645. Some decades later it was able to turn out annually about 400 tons of pig iron.[56] It had replaced an older, much smaller furnace, apparently similar to the ones in Sussex which had produced about 100 tons or even less in Elizabeth's reign.[57] These were probably the typical blast furnaces until after the middle of the seventeenth century in all those French provinces where iron had come to be made mainly by the roundabout process. In the others the scale of enterprise was even smaller.

[53] Leroux, *op. cit.*, p. 60; Coquille, *op. cit.*, pp. 356–58; Chabrand, *op. cit.*, p. 25; Giraud, *op. cit.*, p. 218.

[54] Bardon, *op. cit.*, pp. 39–41; Henri Rouzaud, *Histoire d'une mine en mineur: La mine de Rancié* (Toulouse, 1908), pp. 93–94. The Comté de Foix was annexed to the French kingdom in 1589.

[55] Nef, "Note on Iron Production," p. 401.

[56] Corbier, "Notice sur les forges impériales de la Chaussade," *Bulletin de la Société Nivernaise des Lettres, Sciences et Arts* (2d ser., 1869), pp. 357–58.

[57] Nef, "Note on Iron Production," p. 401.

The annual output of pig iron in England and Wales on the eve of the Civil War almost certainly exceeded 20,000 and may have reached 40,000 tons.[58] For France we have no estimate of production before 1789, when the output of pig iron stood at about 136,000 tons, rather more than half of which came from the *généralités* of Strasbourg, Nancy, and Besançon—territory which had not belonged to the French kingdom under Louis XIII.[59] The whole of France as it was bounded in his reign, an area that contained nearly twenty million people in 1789, was then producing only about twice as much pig iron as had been made a century and a half earlier in England and Wales, with a population little more than a fourth as large. Meanwhile, there had been a remarkable growth in the output and the scale of enterprise in central and western France.[60] Before this growth, in the reign of Louis XIII, the production of pig iron in England was probably greater absolutely than in France; it was certainly very much greater relative to population. France was no doubt ahead in iron made directly from the ore by more primitive methods. But this could have hardly offset the English lead in the production of pig iron.

VII. THE MANUFACTURE OF METAL WARES

While the growth in the output of English iron was hindered even before the death of Elizabeth, and brought to an end some years before the Civil War, by the shortage and dearness of wood, that difficulty did not interfere directly with the growth in the production of metal wares, because coal was successfully substituted for wood as fuel in almost every operation after the

[58] *Ibid.*

[59] Cf. Part I, p. 295. The whole French kingdom produced 282,730 *milliers de livres* of pig iron, of which 146,615 *milliers* came from the *généralités* of Strasbourg, Nancy, and Besançon (H. and G. Bourgin, *L'industrie sidérurgique en France* [Paris, 1920], p. 463). The figures have been reduced to metric tons by Professor Heckscher on the assumption that the average weight of the *livre* was 0.49 kg. (*op. cit.*, I, 201 n.). In this way he got "about 138,000 tons." If we reduce the figures rather to tons of 2,240 lb., the result is about 136,000 tons.

[60] It would require more space than is at my disposal to give the evidence on which this statement is based. I hope at some future date to discuss in detail the growth of French industrial output in the late seventeenth and eighteenth centuries.

metals had been extracted from their ores.[61] Before Elizabeth's reign a good deal of the metal produced in England had been sent abroad to be worked by foreign craftsmen,[62] and the English had been dependent on continental countries, especially Germany and the Netherlands, for many kinds of finished metal commodities. The introduction into England, during the reigns of Elizabeth and James I, of brass-making and new methods of steel-making laid the foundations for a greater independence. The skill of English craftsmen, particularly the cutlery workers, increased so much that an Englishman could boast in the reign of James I, "The best and finest knives in the world are made in London."[63] Nails and pins, kettles and pans, cutlery and cannons of domestic manufacture not only came into more general use at home, where the market for all of them was growing scarcely less rapidly than that for window panes and bottles, but they were exported in much more substantial quantities than in the reign of Henry VIII.

We have a partial record for the three years 1634–36 of English exports of iron and iron wares.[64] It shows that by this time the latter greatly exceeded the former in value and probably even in volume. In all, 629¾ tons of English-made iron were shipped to foreign parts, 444 tons of which went to Africa and the Canary Islands.[65] The exact volume of iron goods shipped cannot be determined because the entries are given in a variety of different quantities not susceptible of reduction to any common denominator. In addition to miscellaneous iron wares and tools to the

[61] Nef, *Rise of the Coal Industry*, I, 201–5, 245–46; "The Progress of Technology, 1540–1640," *Economic History Review*, V (1934), 15–16.

[62] Cf. above, p. 515.

[63] G. I. H. Lloyd, *The Cutlery Trades* (London, 1913), *passim*, esp. p. 93; R. E. Leader, *History of the Company of Cutlers in Hallamshire* (Sheffield, 1905), p. 11 and *passim*.

[64] Sloane MSS (British Museum), 2103, fols. 247–65. The record covers the period from February, 1633/34, to December, 1636, but it is not clear whether it is a record of exports from England and Wales as a whole or only of exports from certain places.

[65] The iron exports recorded in the document come to 1,010¾ tons, but 321 tons were re-exports of Spanish iron and 60 tons re-exports of Irish iron. For English imports of Spanish iron see also *Calendar of Exchequer Depositions by Commission*, p. 415.

value of £3,246, the exports included 32 cannons and 26 tons of additional large ordnance, 9,636 pieces of small arms, 600 swords, and 56 tons of shot. They also included 5½ tons of wire, 30 or more tons of nails, and a fair quantity of such articles as anchors, chimney backs, locks, tacks and rivets, axes, hatchets, hoes, puncheons, shovels, saws and scythes, spurs, stirrups and bits, kettles, pots, and pans. England was sending andirons, smoothing irons, tacks, anchors, and rivets even to the Netherlands, one of the chief foreign sources for supplying the English market with metal wares.

A growth in the imports of metal from Flanders, Spain, Ireland, and, above all, Sweden made possible the continued expansion of the metal trades, even after the progress of smelting at home was checked by the scarcity of wood fuel. The records of commodities passing westward through the Danish Sound suggest that the imports of iron from the Baltic increased several fold between 1565 and 1635, and that the expansion in this trade was most rapid between 1624 and 1628, at just the time when the growth in the native production of iron probably came to an end. In the thirties England was probably importing several thousands of tons every year, chiefly from Sweden.[66] The ironmongers, carpenters, black-

[66] N. E. Bang, *Tables de la navigation et du transport des marchandises passant par le Sund* (Copenhagen), Vol. II (1922), *passim*. If we compare the average annual shipments of iron from the Baltic through the Danish Sound in the two five-year periods 1562–66 and 1635–39, we find that they increased about sixfold, from less than 900 to about 5,000 tons (allowing 6.4 *skippund* and 0.5 *laest* to the ton). Most of the expansion occurred between 1624 and 1628, when the traffic grew nearly fourfold in five years. At the same time there was a great increase in the proportion of iron coming from Sweden rather than from East Prussia, until, on the eve of the English Civil War, practically all the iron passing westward through the Sound was Swedish. During the thirties the annual shipments of iron remained steady at about 5,000 tons, but they again increased during the forties and fifties and, when the traffic was not hampered by warfare, reached 10,000 tons and even more. These figures do not include the iron carried out of the Baltic in Swedish ships, which were exempted from paying the Sound tolls, and such shipments first became important in the thirties of the seventeenth century (*ibid.*, p. ix). Nor do the figures include, of course, the considerable quantities of Swedish iron which came to England directly without passing through the Sound.

We have, unfortunately, no record of the destination of the iron cargoes on which a toll was paid. Although the iron carried in English ships did not increase much in the first half of the seventeenth century, it is probable that a large portion of the

smiths, and nailers of London, like the cutlery workers of Sheffield, became no less eager to prevent regulations designed to reduce or prohibit the importation of foreign iron than the owners of blast furnaces were eager to promote them.[67] That is because foreign supplies were becoming indispensable to the English artisans. Before Elizabeth's reign more metal had been produced at home than had been worked into finished commodities. On the eve of the Civil War more metal was worked into finished commodities at home than was produced at English furnaces and forges. The output of metal wares grew even more rapidly during the century from 1540 to 1640 than the output of metal.

In France there was no general deforestation such as occurred throughout Great Britain, and timber prices were rising much more slowly than in England. It was not, as in England, a shortage of wood fuel which was holding back the smelting of ores;[68] it was the lack of new markets for metal. There is no evidence of any great increase in the demand for foreign supplies to supplement the domestic stock of iron, such as occurred in England during the decades preceding the Civil War. We have no records of French iron imports during Louis XIII's reign. But some thirty years

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Swedish iron exported both in Swedish ships and in ships from Dutch and German ports went to England; for in 1668 it was estimated, perhaps with some exaggeration, that during recent years the annual English imports of Swedish iron had amounted to 12,000 tons (see below, n. 70).

[67] John Nicholl, *Some Account of the Company of Ironmongers* (London, 1851), pp. 178–80; *V. C. H. Derbyshire*, II, 359–60; Straker, *op. cit.*, p. 62. Although the nailers at first supported a project presented in James I's reign to prohibit the import of Flemish iron, they afterward decided, "after better consideration of the busynes," to oppose it (Nicholl, *op. cit.*, pp. 177, 180–81).

[68] See Nef, *Rise of the Coal Industry*, I, 161–63, for a comparison of timber prices and supplies in France and England; Leroux, *op. cit.*, pp. 60, 67; Rouzaud, *op. cit.*, p. 99, for evidence that the smelting of iron ore in the Perche and the Comté de Foix was not being held up by any shortage of wood. There were local complaints against the smelters of iron ore for their causing a rise in the price of firewood in a number of French towns, especially at Grenoble and Nevers (Giraud, *op. cit.*, pp. 222–23; Massé, *op. cit.*, II, 198). But such complaints were not new at Grenoble, and, notwithstanding the alarm of the citizens of Nevers over a possible shortage of wood, both Guy Coquille, a native, and Thomas Coryat, an English traveler, wrote in Henri IV's reign of the abundant store of trees which they saw in Nivernais along the banks of the Loire where the iron mills were at work (Coquille, *op. cit.*, p. 337; *Coryat's Crudities* [new ed.; Glasgow, 1905], I, 197).

later, when they could hardly have decreased, they were greatly inferior to English iron imports. According to accounts kept by the French government, the average annual imports during the years 1669, 1671, and 1672 amounted to only 3,745 tons of bar iron, 334 tons of pig iron, and 701 tons of iron in other forms including steel and wire. Some of these supplies came, not from foreign countries, but from provinces like Dauphiné, whose products were treated by the customs officials as imports when they were brought into other parts of France.[69] The English imports of iron from Sweden alone in favorable years for trade were estimated in 1668, perhaps with some exaggeration, at 12,000 tons.[70] Even before the Civil War, England, with about a third the population of France, had probably begun to bring in a larger absolute quantity of iron for use in her manufactures.[71] This suggests that the contrast between the sluggish growth of French output and the rapid expansion of English, which we found in connection with iron production, was at least equally striking in connection with the production of metal wares.

That impression is confirmed by a comparison between the English and the French markets for such wares. There was only one group of metal commodities for which the French demand was increasing between 1540 and 1640 even more than the English. These were the fine artistic wares—such as ornamental balustrades, window grills, entrance locks and knockers, and locks and decorations for strong boxes, with which the court and the nobility embellished their houses—and the more luxurious cutlery which they bought chiefly for display, alongside the glass mirrors, modeled by fugitive Venetians or their pupils, and the beautiful

[69] Archives Nationales, F^{12} 1834A. A good deal more than two-thirds of the iron and at least three-fifths of the steel entered in these returns certainly came from foreign countries. The remainder was entered under the following customs divisions: *Caen par terre*, which apparently covered the land traffic from Brittany into Normandy, *Maine et Anjou*, *Chalons et Troyes*, *Bourges et Moulins*, *Dijon et Chalon-sur-Saône*, *Lyon Valence et Bresse*, and *Poitou*. It is not possible to estimate how much of the iron entered under these divisions came from French territory, but it was probably considerable. On the other hand, some imports of foreign iron probably escaped entry in the returns (cf. above, n. 39).

[70] *Calendar of State Papers Domestic*, 1668–69; p. 140; cf. above, n. 66.

[71] Cf. Part I, p. 295.

pottery and enamel work done by Bernard Palissy and his followers. Some of these metal wares, like the glass and the pottery, have found their way in our own time into museums and private collections.[72] They were the products of artistic craftsmanship. The monumental locks, for example, with their groups of lifelike figures arranged in unified designs, show that the artisans who made them used iron as a medium for expressing their love of beauty, much as the Renaissance sculptors used stone. Some of their works seem to echo the marvelous groups of statues on the screen which surrounds the choir of Chartres Cathedral.[73]

If the fashioning of metal ornaments required much skill and patience, a fine sense of aesthetic values, elaborate and varied labor, the amount of metal consumed in the process was small. Three tons of pig iron were regarded as an adequate supply for the shop of a steel-maker in Dauphiné in 1660,[74] and such shops produced sickles, scythes, and swords, as well as fine steel for artistic cutlery. Diderot once said that the achievement of the artist consists in creating a world out of nothing; and, compared with the anchorsmith or even the nailer or blacksmith, the artistic metal-worker of the age of Montaigne was certainly making much out of little. Nor was that little all metal. The cutlers, who forged the knives and razors for courtiers and for other very wealthy people, mounted them in exotic wood, tortoise shell, mother of pearl, and ivory, and had to master the craft of manipulating all these materials as well as iron and steel.[75]

In the production of common cutlery—sickles, scythes, and ordinary knives—where a keen cutting edge was of more importance than a beautiful appearance, the English were making more rapid progress than the French. Moulins and St. Etienne, alone among the chief cutlery-producing towns of France, showed a remarkable increase in the number of cutlers between 1540 and 1640. There was a rather rapid growth in the cutlery trade at Thiers, a slow growth at Paris and Chatellerault, the most famous French cutlery centers in the late Middle Ages, and something of a decline

[72] H. R. d'Allemagne, *La ferrurerie ancienne* (2 vols.; Paris, 1924).

[73] Cf. *ibid.*, Pls. XXXVIII, XLVI, XCII, and CX.

[74] Giraud, *op. cit.*, p. 245.

[75] Pagé, *op. cit.*, I, 161.

at Toulouse.[76] There was nowhere in France an expansion of the cutlery manufacture comparable to that which occurred in London and in and around Sheffield and Birmingham.

Ways of living and standards of comfort were changing in England more rapidly than in France, especially among the common people. At least one of the changes—the adoption of the coal-burning fire—caused a demand for metal not felt across the Channel. To replace logs by coal in the domestic hearth, it was necessary to have an iron grate, and the growing use of coal by rich and poor alike in London, with its tens of thousands of new houses, as well as in scores of provincial towns and villages, was accompanied by a demand for tens of thousands of grates. A generation accustomed, like our own, to iron and steel construction would hardly suppose that the general adoption of grates could have caused an impressive increase in metallurgical enterprise. But it should be remembered that the seventeenth century was an age of wood. Metal was still used only where it was indispensable—as for the cutting edges and striking faces of tools and for objects which had to resist fire. Iron grates required more metal than sickles or scythes, shovels or plowshares, and their widespread adoption added substantially to the importance of the English metal trades.

While metallurgical enterprise was stimulated by the growing demand for metal wares in housekeeping, the remarkable increase during the century from 1540 to 1640 in the tonnage of metal commodities produced in England was caused chiefly by the demands of the rising industries such as mining, smelting, shipbuilding, and salt-boiling. Mining at depths of more than a hundred feet required what were, for the age, large quantities of metal. Besides the picks and other tools, used even in shallower pits, it involved the use of the newly invented boring rods and also of brass sockets, iron cogs and gears, axles, chains, and gimbals which formed part of the pumping and winding machinery.

The smelting of iron ore by the new roundabout process required similar metal parts for the machinery which drove the bel-

[76] *Ibid.*, Vol. I, *passim*.

lows, both at the furnaces and forges. The new forges had, in addition, machine-driven hammers, which were larger than those of the earlier mills and sometimes weighed hundreds of pounds.

Even in an age of wooden ships the builders needed so many metal parts that an Englishman could write shortly before the Civil War, "Navigation on Iron does stand."[77] Every new keel laid upon the stocks at shipyards in Ipswich, Harwich, and other ports not only required a large supply of small metal wares, such as nails, bolts, and clamps, but it had to be provided with heavy anchors and chains. In addition, many merchantmen were armed with cannons to protect them from foreign battleships in time of war and from pirates in time of peace. Still more metal-work was required in building men-of-war. Even before the Anglo-Dutch naval battles of the mid-seventeenth century, they bristled with culverins and even larger cannons, and their hulls were sheathed with iron.

Salt-making, as it developed after the dissolution of the monasteries, probably used almost as much metal as shipbuilding. The scores of pans in which sea water came to be heated in the north of England were great rectangular basins made of pieces of heavy iron riveted together, two or three feet high on each side and sometimes from twenty to thirty feet across.

As the output of mines, furnaces and forges, shipyards, and salt works was growing much more rapidly in England than in France,[78] the markets which these industries provided for metal wares must also have grown much more rapidly. By the reign of Charles I, England, with about a third the population of France, was probably producing as much iron, more ships, and nearly fifteen times as much coal. And in England coal mining required a much larger amount of metal machinery for a given output than in France because the mines were deeper.

The French still produced much more salt than the English,

[77] Nicholl, *op. cit.* (2d ed., 1866), pp. 211–13.

[78] The same thing was also true of the output of breweries, soapworks, and alum and copperas factories (see the sequel in the October number of this *Journal*). Such enterprises, with their large cauldrons, sometimes required as large a volume of metal wares as the chief mines and smelting establishments.

but salt-making in France required almost no metal. Nearly all French salt was obtained without artificial heat from sea water at the marshes along the Mediterranean and the Bay of Biscay.[79] On both coasts even as late as the nineteenth century the earth itself formed the rectangular basins in which the salt water evaporated in the sun; one basin was separated from another by a dyke of earth, and the water was brought to the reservoirs, whence it flowed into these basins, through pipes cut out of tree trunks.[80]

The industrial demands for metal goods of all kinds grew so much more rapidly in England than in France that before 1640 England had probably obtained more of a lead over France in the volume of metal wares manufactured than in the volume of ores smelted. Ornamental craftsmanship, which did not require large amounts of raw material, was the only branch of metallurgical enterprise in which the French retained their leadership. The hands engaged in hammering out the more common wares in thousands of domestic shops and a few small factories were much more numerous, relative to the total population, in England than in France. They probably numbered some tens of thousands.

VIII. THE BUILDING TRADES AND THE TEXTILE INDUSTRIES

The building of castles, palaces, town halls, dwelling-houses, small factories, warehouses, and bridges, together with the manufacture of bricks, lime, and other necessary materials, probably employed nearly as many workpeople in the early seventeenth century as the metal trades. Spinning, carding, weaving, dyeing, hatmaking, and other branches of textile manufacture undoubtedly employed more persons than the metal and the building trades combined. The building and the textile industries deserve a lead-

[79] Where artificial heat was employed, in the manufacture along the coast of western Normandy (see Part I, p. 296, n. 14), the sea water was heated, not in great iron pans, but in tiny cauldrons of lead, such as had been used at the English brine springs at least as early as the thirteenth century (P. Boyé, *Les salines et le sel en Lorraine* [Nancy, 1904], p. 5). In Franche-Comté and Lorraine large pans, similar to those adopted in England for manufacturing salt from sea water, were used to heat the brine from springs at Salins and other less important salt-making centers. But Franche-Comté and Lorraine were not yet part of the French kingdom (cf. Part I, p. 295).

[80] Eugène Lefebvre, *Le sel* (Paris, 1882), pp. 77–78, 108–12.

ing place in a comparison of industrial growth in France and England. I have not made a special study of either. Even had I done so, it would probably have been impossible to make even a rough comparison between the output of bricks or cloth in the two countries, as I have attempted to do for the output of coal and iron. But such general knowledge as we possess of the history of the building and the textile industries suggests that the contrasts between their progress in France and in England were similar to those between the progress of the mining and the metallurgical industries in the two countries.

With respect to building the century was one of far greater activity in England than in France. Social changes and changes in the technique of construction likely to promote new building were much more pronounced. The dissolution of the English monasteries, which threw a considerable portion of the land on the market, led to the replacement of old ecclesiastical buildings by new lay manor houses. Abandoned abbeys and priories, with their abundant supplies of dressed and undressed stone, provided cheap materials and became a happy hunting ground for local building contractors.[81] In England the population was increasing considerably, but in France it was practically stationary. There were much more extensive migrations of people from one part of the country to another in England than in France, and these were not altogether movements of vagabonds whose resources, even when they found work in the rising rural industries, only permitted them to build hovels or unpretentious cottages. Yeomen of substance, the younger sons of the landed gentry and even the nobility, were seeking their fortunes in provincial towns and especially in the capital. Between 1540 and 1640 the population of London grew five- or sixfold, while that of Paris increased much more slowly. Even the humble workmen who came to the capital had to be housed, and tenements were built for them in many parts of the city. The rise of the trader and moneylender to new positions of affluence and power was carried much farther in England than across the Channel. More new wealth was being created. This encouraged the building of new, expensive houses not only in

[81] D. Knoop and G. P. Jones, *The Mediaeval Mason* (Manchester, 1933), p. 189.

the towns but in the country, where the merchants were acquiring manors by the hundreds from the older landed classes. At the same time the growing instability of wealth and place, which accompanied the rise of the mercantile classes, weakened one of the primary motives that had guided the great medieval builders—that of creating permanent monuments. Old dwellings were torn down and new dwellings built much more readily than in France.

On the technical side the introduction of glass windows was more general in England than in France, and the introduction of new fireplaces and chimneys suitable for burning coal was confined almost altogether to England. Both changes encouraged the English to replace old dwellings by new ones, equipped with the new conveniences which were coming to be regarded as essential to comfort.

The scarcity of timber might have checked the growth of building in England, had it not been possible to substitute stone and especially bricks.[82] Lime for solder had been sometimes made by a coal fire even in the Middle Ages, and after about 1610 a method was found which permitted, at least to some extent, the substitution of coal for wood in baking bricks.[83] Thus the amount of timber consumed in construction work was greatly reduced, and the English building industry largely escaped the difficulties which had begun to hold back the progress of the metallurgical industries as early as the reign of James I.

When we think of the reigns of Francis I and his successors down to Louis XIII, we are likely to remember the marvelous harmony of the great chateaux along the lower Loire, in Berry, the Ile-de-France, and many other parts of the French kingdom. They remain as monuments to the taste and skill of French architects and builders of the Renaissance. The Elizabethan manor houses like Wollaton or Knole, fine though they are, are not quite equal in beauty to castles like Azay-le-Rideau, Chambord, or Anet. But we should remember that most of the finest French chateaux were started, and some completed, before 1540.[84] Nor should we forget that contemporaries living in Shakespeare's time,

[82] *Ibid.*, p. 190; Nef, *Rise of the Coal Industry*, I, 187.

[83] Nef, *Rise of the Coal Industry*, I, 205, 216–17.

[84] Cf. Boissonnade, *op. cit.*, p. 38.

who knew both countries, must have been chiefly struck by the thousands of new, if more prosaic, dwellings of stone and brick with their chimneys, built in London, Norwich, Newcastle, Nottingham, and other towns, and also by the fine manor houses, set in newly laid-out parks and frequently paid for with the money of merchants who retired from trade or married their daughters into the gentry and the nobility. French merchants were acquiring many *fiefs* and *seigneuries* and were building expensive houses both in the country and in the towns, but to nothing like the same extent as English merchants.

In the days of Shakespeare and Milton, Londoners who sauntered out for an afternoon stroll were accustomed to the constant noise of saws and hammers and to the sight of dozens of new dwellings in various stages of construction, with carpenters, masons, plasterers, and bricklayers busy at their trades. As in the growing American cities of the late nineteenth and early twentieth centuries, houses were put up helter-skelter, often with a complete disregard of the building rules promulgated by the Crown.[85] Early in 1637 no less than two hundred new buildings, erected in Wapping during the previous summer, were ordered torn down because they did not conform to the regulations.[86] London expanded in every direction into areas once meadows and woodlands, and absorbed old villages. The brickmakers were charged with spoiling the neighboring fields in their search for earth.[87]

The last years of the sixteenth century and the early part of the seventeenth were marked not only in London but in many parts of England by a greatly increased demand for new dwellings of all kinds. At the same time hundreds of sheds, barns, and new buildings to serve as small factories were put up in connection with the expanding industries. In France, to judge from the history of Rouen—the most important mercantile town after Lyons and Paris—this was probably a period of slower growth in build-

[85] For these rules see W. Cunningham, *The Growth of English Industry and Commerce: Modern Times* (6th ed.; Cambridge, 1919), pp. 315–17.

[86] *Calendar of State Papers Domestic*, 1636–37, p. 542. The State Papers for the reigns of James I and Charles I are full of evidence concerning the extraordinary activity of the builders in London and the attempts of the Crown to regulate it.

[87] *Ibid.*, 1637–38, p. 107.

ing than the last half of the fifteenth and the first half of the sixteenth centuries.[88]

There was less difference between the progress of the textile manufactures than between that of the building trades in the two countries. But in so far as contrasts did exist, they were of a similar kind. In some branches of textile work the French retained and even increased their lead over the English. These were mainly the making of silk and lace goods and of tapestries, wanted as luxury articles and objects of art chiefly by the court, the nobility, the richer mechants, and a few churchmen. When it came to the production of more homely wares—woven out of cotton, hemp, flax, and, above all, wool—for which the demand was general, the positions of the two countries were different. Of the more common textile fabrics, woolens were undoubtedly the most important, though in France the manufacture of woolen cloth did not exceed that of linen by as big a margin as in England.[89]

The great advantage held by the English over the French in the manufacture of woolen cloth of most kinds throughout the *ancien régime* is one of the commonplaces of economic history. Everywhere in France the growth of the manufacture was handicapped by a partial dependence on foreign countries for raw materials, for wool itself and for the alum[90] needed in dyeing. While the woolens produced in a few provinces like Poitou had some market in other parts of the kingdom,[91] there was no general concentration of the manufacture of ordinary cloth, such as had already taken place in England in the west country before our period, and such as was taking place during it in East Anglia and

[88] R. Quenedey, *L'habitation rouennaise* (Rouen, 1926), pp. 56–58, 77–78.

[89] Fagniez tells us that the production of linens in France was more important than the production of woolens. But, if he means that the output was greater, he offers no evidence in support of that view except a passage in Montchrétien, suggesting that linen goods formed a more valuable branch of exports than woolen (*L'économie sociale de la France* [Paris, 1897], pp. 138–42). The late M. Raveau's careful study only partly bears out Fagniez, in so far as Poitou is concerned. In one place Raveau says that *tisserands en toile* were more numerous than *tisserands en drap ou en serge*, but in another he speaks of the manufacture of woolen cloth as the most important industry of Poitou (*Essai sur la situation économique et l'état social en Poitou* [Paris, 1931], pp. 28, 5).

[90] See the sequel in the October number of this *Journal*.

[91] Raveau, *op. cit.*, pp. 20–22.

in Lancashire and the West Riding. French exports of woolen cloth were small compared with imports, and these came from Italy, Flanders, and, especially, England.[92]

It is not clear which of the two countries had an advantage in the output of cotton goods in the seventeenth century. But the use of cotton undoubtedly increased more rapidly between 1540 and 1640 in England than in France, where nothing occurred comparable to the remarkable extension of cotton manufacture in Lancashire at the end of the sixteenth and beginning of the seventeenth centuries. Throughout the period England imported some fustians from abroad, but by 1620 she had begun to export substantial quantities to France and also to Spain, Holland, and Germany.[93] Already in the reign of Henri IV the principal French centers of fustian manufacture at Rouen and Troyes suffered from foreign, and particularly English, competition.[94]

While the French had probably fallen behind the English in cotton manufacture, it is possible that they made more linen goods from flax and hemp than the English during the whole of our period. But if they had an advantage here, it could not have offset their heavy disadvantage in the woolen manufacture.

When wealthy Englishmen began to grumble toward the end of the seventeenth century over the prohibitively high duties levied by successive Parliaments upon imports, some of them complained that, if French clothing were effectively shut out, they would no longer be able to tell their wives from their chambermaids. Ladies of fashion were getting their fine dresses from Paris as they have done ever since. While these ladies often had most elaborate wardrobes, they were few in number. The amount of cloth in the dresses of ladies who could afford chambermaids was negligible compared with the volume of all kinds of cloth produced. By the seventeenth century, if not before, the common people who formed the overwhelming majority of the population in both countries, had come to be more amply provided with clothing, bedding, and hangings in England than in France.

[92] Fagniez, *op. cit.*, pp. 83, 137–38.

[93] Wadsworth and Mann, *op. cit.*, p. 21.

[94] Fagniez, *op. cit.*, p. 142.

[To be continued]

THE GOLD CERTIFICATE

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ONE of the recent changes in the monetary system of the United States has been the withdrawal of the gold certificate from circulation. It remains in existence, but now serves as a claim of the Federal Reserve banks upon the Treasury for gold.[1] The gold certificate has had a curious history that illustrates very well the unsystematic fashion in which the monetary system of the United States has developed.

The history of the gold certificate is shown graphically in the Charts I and II. The amount of gold certificates in circulation has varied with statutory changes and with policies of the Treasury and of the Federal Reserve authorities. At several times over $1,000,000,000 in this form of currency has been in circulation. In terms of percentages, gold certificates have represented as much as 30 per cent of all forms of money in circulation.[2] Only a small portion of the history of the gold certificate is revealed in these two charts.

Probably the most interesting feature is that the Treasury is permitted by statute to maintain less than one dollar in gold for each dollar in gold certificates which is outstanding. Under the terms of the statute of 1863, which created the gold certificate, the Treasury is authorized to issue $120 of gold certificates for each $100 of gold held by it. This statute has never been repealed, although several acts relating to gold certificates have been passed in the intervening period.[3] The explanation of this curious situa-

[1] Cf. the Gold Reserve Act of 1934 (Pub. No. 87 [73d Cong.]).

[2] The charts are constructed from data for the end of the fiscal year, i.e., June 30. The following sources were used: *Annual Report of the Secretary of the Treasury for 1928*, pp. 554–55; *Annual Reports of the Federal Reserve Board* as follows: 1930, Table 32; 1932, Table 52; 1933, Table 56; and the circulation statement of the United States Treasury for June 30, 1934, and for June 30, 1935.

[3] The basis for this statement is the inclusion of sec. 428 in chap. 31 of the *United States Code of Laws Adopted June, 1926*. See also 31 U.S.C.A. 428. The same sec-

CHART I

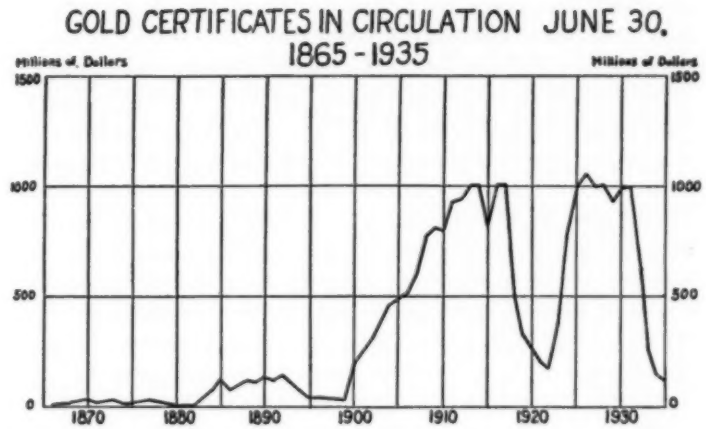
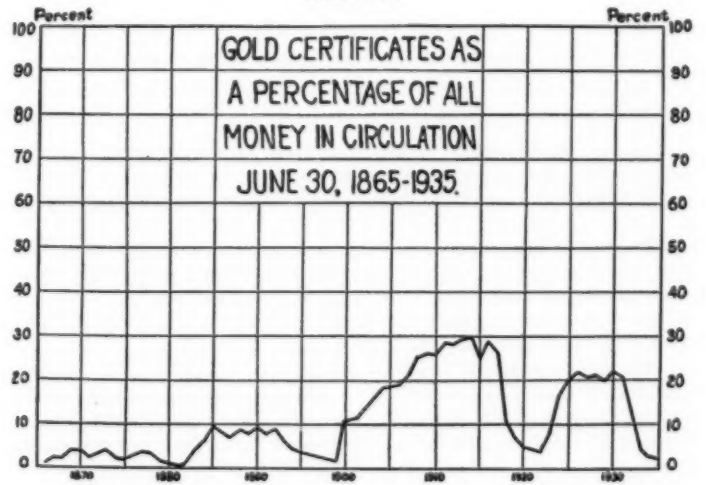


CHART II



tion may be understood only by a careful study of the legislation controlling the issuance of gold certificates and of the place of the gold certificate in the monetary system.

The gold certificate was created in 1863 by the passage of an act whose principal purpose was the provision of means of financing the expenditures of the Civil War. Congressional debate centered about those sections of the bill which authorized the Treasury to sell bonds and to issue United States notes and legal-tender Treasury notes. The bill originated in the House and, as reported from the Ways and Means Committee, included a section authorizing the secretary of the Treasury to issue certificates payable upon demand upon the deposit of coin or bullion.[4] As is revealed by the House debate on the bill, the purpose of authorizing the issuance of these certificates was to afford a convenience to merchants in the payment of customs duties. The argument was advanced that if these certificates were authorized to be issued, the transportation of coin and bullion from the customs-house to the subtreasury might be avoided.[5] In the course of the consideration of the bill upon the floor, Representative Horton of Ohio offered an amendment relating to gold certificates which was adopted. This amendment was in the form of an entire section and replaced section 5 of the bill. Inasmuch as it constitutes section 5 of the act as passed, it is given in full.

And be it further enacted, That the Secretary of the Treasury is hereby authorized to receive deposits of gold coin and bullion with the treasurer or any assistant-treasurer of the United States, in sums not less than twenty

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tion is included in the *Code of Laws of the United States of a General and Permanent Nature in Force January 3, 1935* (Washington: Government Printing Office, 1935) as sec. 428, chap. 31, p. 1387. As noted in the foregoing, the source of this section is *Revised Statutes*, sec. 254, which was derived from *Statutes at Large of the United States* (37th Cong., 3d sess.), chap. 33, sec. 5.

[4] The bill as reported did not specify whether silver or gold was meant, and had the bill been passed as reported the silver certificate would have been created in 1863 rather than in 1878 by the Bland-Allison Act. The Ways and Means Committee draft (H.R. 659) is printed in the *Congressional Globe* (37th Cong., 3d sess.), pp. 283–84.

[5] See the remarks of Representatives Morrill and Hooper, *ibid.*, pp. 295, 458. Both spoke favorably and neither regarded the creation of certificates a momentous matter.

dollars and to issue certificates therefor, in denominations of not less than twenty dollars each, corresponding with the denominations of the United States notes. The coin and bullion deposited for or representing the certificates of deposit shall be retained in the Treasury for the payment of the same on demand. And certificates representing coin in the Treasury may be issued in payment of interest on the public debt, which certificates, together with those issued for coin and bullion deposited, shall not at any time exceed twenty per centum beyond the amount of coin and bullion in the Treasury: and the certificates for coin or bullion in the Treasury shall be received at par in payment for duties on imports.[6]

The clue as to the purpose of the entire section, and especially the 20 per cent provision, is contained in the remarks of Representative Hooper of Massachusetts, to whom Horton deferred when questioned by Pendleton of Ohio.[7] The latter was the only person in either branch of Congress who questioned the advisability of creating gold certificates, and his objection was that the Treasury should not be burdened with the cost of safekeeping gold.[8] In answer to Pendleton, who had seized on Horton's amendment as an opportunity to attack the entire idea, Hooper said that since it would be out of order to mention the secretary of the Treasury he would find it difficult to explain the origin of the section.[9] His remarks seem to indicate that the idea of gold certificates originated with Secretary Chase. He pointed out that the authorization of the secretary of the Treasury to issue gold certificates upon gold deposited with the Treasury by merchants in order to pay interest upon the public debt would compensate the Treasury for the costs of safekeeping gold. It was not made clear whether the suggestion had come from Secretary Chase, nor was any explanation offered as to why a 20 per cent limit was fixed, although Hooper pointed out that a specie reserve of 5 per cent was "considered safe" for bank notes.

[6] *Ibid.*, p. 457, and *Statutes at Large* (37th Cong., 3d sess.), chap. 33, sec. 5.

[7] Horton's own part appears to have been slight and to have consisted of introducing Hooper's amendment when the latter left the floor.

[8] *Congressional Globe* (37th Cong., 3d sess.), pp. 457–58. Hooper's brief speech is recorded on p. 458.

[9] Previous to Hooper's speech the House had decided, after consulting its manual of procedure, that the wishes of the executive branch of the government should not be mentioned on the floor. This rule was derived from English parliamentary practice.

The bill underwent extensive amendment in the Senate, and three conference committees had to be appointed before the House and the Senate could agree; but the disputed points did not include the authorization of gold certificates. The Senate did not alter section 5, which stood as amended in the House when President Lincoln signed the bill on March 3, 1865.

The indifference of Congress to section 5 appeared to have been justified, for no gold certificates were issued until November 13, 1865.[10] Thereafter, however, the gold certificate came into limited use. As may be seen from the chart, the volume of gold certificates barely exceeded 4 per cent of the total money in circulation in the period 1865–79. The Treasury did not avail itself of the opportunity to issue gold certificates upon deposited gold to pay interest upon the public debt. Receipts of gold from customs duties were more than adequate to meet the gold liabilities which resulted from the fact that the interest on the public debt was payable in coin.[11]

One month before the return to specie redemption of United States notes, Secretary Sherman suspended the issue of gold certificates. In justification of his action, he pointed out that since United States notes would be redeemable in gold after January 1, 1879, there was no reason for him to continue to issue gold certificates under the authority vested in him by the Act of March 3, 1863.[12] The volume of gold certificates outstanding declined until 1882 when only about $5,000,000 remained outstanding.

Secretary Sherman's action was overridden in 1882 by the passage of a new act "authorizing *and directing*" (italics mine) the Secretary to issue gold certificates.[13] This was accomplished by a

[10] *Annual Report of the Secretary of the Treasury for 1879*, p. 357.

[11] The annual reports of the Treasurer, which are included in the *Annual Reports of the Secretary of the Treasury*, show a continuous excess of receipts of gold over disbursements. In fact, from July 1, 1866, until December 31, 1878, the Treasury sold $526,506,273.81 of gold at an average premium of 20.3 per cent (*Annual Report of the Secretary of the Treasury for 1879*, p. 337).

[12] Suspension took place December 1, 1878. Secretary Sherman's explanation may be found in the *Annual Report of the Secretary of the Treasury for 1879*, p. xii. He observed that persons might readily hoard gold at no expense to themselves by depositing gold in exchange for gold certificates.

[13] Act of July 12, 1882, *Statutes at Large of the United States* (47th Cong., 1st sess.), chap. 290, sec. 12.

Senate amendment to an act extending the charters of national banks.[14] The new law differed from that of 1863 in that its language was mandatory and in that it authorized the secretary to suspend issuance whenever the reserve for United States notes fell below $100,000,000. The last-mentioned provision was added when it was pointed out that gold certificates might serve to embarrass the Treasury.[15] The most remarkable feature of the 1882 legislation is that the 1863 act was not repealed, although the new law was almost an exact restatement of the old except that the 20 per cent feature was not included and that the power of the secretary to suspend issue was restricted. Conceding that the issue of gold certificates was mandatory, the secretary proceeded to issue them.[16] Charts I and II show a rapid growth after 1882, both in dollar volume and as a percentage of the circulating medium, in the amount of gold certificates outstanding. The Treasury regarded the safekeeping of the gold as both expensive and dangerous, recommending to Congress the retirement of this form of currency.[17]

In 1893 the secretary of the Treasury again suspended the issue of gold certificates. The redemption of United States notes and Treasury notes of 1890 had reduced the Treasury's gold reserve below the amount stipulated by the Act of July 12, 1882.[18] By

[14] See the *Congressional Record* (47th Cong., 1st sess.), pp. 4133–34, 5084, 5130, 5167–69. A similar amendment had been offered in the House, but failed of adoption. At this session several separate bills with the same purpose were introduced in both houses (*ibid.*, pp. 4529, 5139).

[15] *Ibid.*, pp. 5167–69. The argument was that anyone might redeem United States notes in gold and deposit the gold in exchange for gold certificates. Because United States notes could not be retired when redeemed, but had to be reissued under terms of the Act of May 31, 1878, the Treasury might thus be subjected to perpetual drain of gold. Representative Hutchins had said in the House that it was for this reason that Sherman had ordered the suspension of issue of gold certificates (*ibid.*, pp. 4133–34). By refusing to issue gold certificates, the Treasury would force those who redeemed United States notes to hold the gold themselves.

[16] *Annual Report of the Secretary of the Treasury for 1882*, p. xii.

[17] See the *Annual Report of the Secretary of the Treasury for 1885*, p. 493, and *ibid. for 1886*, p. 76. The remarks of Representatives Hooper and Pendleton in 1863 were obviously well founded.

[18] The Treasurer of the United States noted that the suspension, which took place April 14, 1893, was misunderstood by the public (*Annual Report of the Secretary of the Treasury for 1893*, pp. 9–10).

June 30, 1899, the amount of gold certificates outstanding had dropped to $34,279,000, a decrease of more than $122,000,000 in seven years. In August, 1899, however, issue was again begun and, following the passage of the so-called Gold Standard Act of 1900, the amount increased year by year until 1914.

The legislation of 1900 again enacted provisions governing gold certificates, without repealing the legislation either of 1882 or of 1863. The re-enactment was justified on the grounds that the 1882 statute was not sufficiently definite.[19] A more specific pledge of gold was made (coin alone being made acceptable), suspension was authorized only during the period when the gold reserve (increased from $100,000,000 to $150,000,000) was deficient, certificates payable to order were authorized, and the smallest denomination was fixed at $20.[20] Until 1934 no further changes of importance were made.[21] Strangely enough, the gold certificate was not made legal tender until 1919.[22]

Although the Act of March 14, 1900, is generally interpreted as having made the gold standard impregnable, the provision of the Act of March 3, 1863, authorizing the secretary of the Treasury to issue a limited additional amount of gold certificates in payment of interest upon the public debt was not repealed. The Treasury has never seen fit to employ this provision and has always taken the position that the most recent act of Congress has governed its activity. One may speculate as to what use might be

[19] The bill was H.R. 1, for which the Senate Finance Committee substituted a completely re-written measure. Senator Aldrich explained the Committee's purposes in a long speech (*Congressional Record* [56th Cong., 1st sess.], pp. 651–53).

[20] Act of March 14, 1900, *Statutes at Large of the United States* (56th Cong., 1st sess.), chap. 41, sec. 6. The "authorized and directed" phrase was retained. Gold certificates payable to order were authorized to replace so-called currency certificates, which were certificates stating that United States notes had been deposited with the Treasury. These had been created in 1872, and had been used as bank reserves and for settling clearing-house balances. The smallest amount of gold to be deposited was fixed at $1,000.

[21] Gold certificates of the ten-dollar denomination were authorized in 1907 (Act of March 4, 1907), and in 1911 foreign gold coins and gold bullion were made acceptable, although a minimum of coin was set (Act of March 2, 1911). The law in force prior to 1934 may be taken to be 31 U.S.C.A. 429.

[22] Act of December 24, 1919. This change was of no practical importance, for the use of the gold certificate had not been hampered in any way by this disability.

made of this provision. Its employment would make the Treasury a bank of issue in a limited measure. The failure to repeal this section of the law in 1900 was apparently an oversight, for no mention was made of it in the extended discussion of the bill in Congress.

From 1900 until 1933 the gold certificate served as hand-to-hand currency and as bank reserves. When member-bank reserves were concentrated in the Federal Reserve banks in 1917, an opportunity was afforded for the withdrawal of gold certificates from circulation. As the charts show, all but a small amount had disappeared by 1922.[23] Then a change in policy occurred. Federal Reserve banks began paying out gold certificates in place of Federal Reserve notes, so that by June 30, 1926, over $1,000,000,000 of gold certificates were again in circulation. These were regarded as a secondary gold reserve, which could be drawn upon by substituting Federal Reserve notes for them as currency flowed in and out of Federal Reserve banks.[24] The placing of gold certificates in circulation served to offset the effects of a growing gold stock upon the reserve position of the Federal Reserve banks. From June 30, 1922, until June 30, 1926, the amount of gold certificates outstanding increased by $1,137,000,000, while the amount in circulation increased by $984,000,000. During the same period the monetary gold stock of the United States grew by $1,660,000,000, so that not all the net increase in the gold stock was offset, as far as bank reserves were concerned, by the increase in gold certificates in circulation.

The secondary gold reserve was less available than had been anticipated. Only about $550,000,000 of a total of $1,050,000,000 in circulation at the beginning of 1931 had been withdrawn by

[23] During this period the amount outstanding also declined, the Federal Reserve banks choosing to hold gold directly rather than gold certificates.

[24] S. E. Harris has carefully investigated the origins of this policy and has found that the Treasury is responsible. Cf. *Twenty Years of Federal Reserve Policy* (Cambridge; Harvard University Press, 1933), I, 353–58. The treasury desired to restore what it considered to be the full gold standard, which encompassed the circulation of gold. As Harris shows, the Federal Reserve authorities acquiesced, after protesting feebly. The new policy was announced by the Treasury March 18, 1922.

January 31, 1933.[25] By means of threatened prosecutions, all but about $100,000,000 have been withdrawn since March, 1933.[26]

The status of the gold certificate has been entirely changed by the Gold Reserve Act of 1934. Gold certificates may now be held only by Federal Reserve banks and redeemed only by them under regulations prescribed by the secretary of the Treasury. The gold certificate is therefore only a means of transferring credits for gold among the Federal Reserve banks and the Treasury.

The legislation of 1934 also appears to have disposed of the 20 per cent excess issue by the section of the Gold Reserve Act of 1934 which reads, "The amount of gold certificates issued and outstanding shall at no time exceed the value, at the legal standard, of the gold so held against gold certificates."[27] Further assurance is given by the final section of the act, which reads, "All acts and parts of acts inconsistent with any of the provisions of this act are hereby repealed."[28] Thus, after seventy-one years, the specter of a gold certificate secured by less than 100 per cent of gold would seem to have been laid, the retention of section 428 of chapter 31 in the United States code notwithstanding.

During the period of its use as a part of the circulating medium, the gold certificate served a variety of purposes. Gold was employed as a circulating medium without the inconvenience of using coins and without loss from abrasion. The gold certificate has frequently been likened to a warehouse certificate. Prior to the creation of the Federal Reserve System, the gold certificate provided a means of obtaining gold.[29] Thereafter, gold could be obtained directly by member banks from their respective Federal Reserve banks, and this soon became the principal source. In the post-war era the gold certificate served no real purpose. The

[25] *Annual Report of the Federal Reserve Board for 1933*, Table 56.

[26] The orders and their legal basis are set forth in the *Annual Report of the Secretary of the Treasury for 1934*, pp. 194–201.

[27] Pub. No. 87 (73d Cong.), sec. 20c. [28] *Ibid.*, sec. 17.

[29] The United States note was also redeemable in gold upon demand. Bank reserves consisted of gold and lawful money, so that gold could be obtained from bank reserves directly or by redemption of those forms of lawful money redeemable in gold.

camouflaging of the increase in the nation's gold stock was completely unnecessary and confused only the uninitiate. Moreover, this policy only served to make gold unavailable when it was needed. The use of "yellowbacks" may have served some slight psychological purpose, but this was lost when the present smaller-sized currency came into use in 1929.[30]

There seems to be little reason for the use of a note secured 100 per cent in gold in the United States. The volume of hand-to-hand currency should not be made to impinge heavily upon the nation's gold stock because of the minor position which notes occupy in the monetary structure.[31] Modern nations have found that a central bank-note issue with a gold backing of 40 per cent or less is entirely satisfactory.[32] The only purpose which the gold certificate served in the post-war era was to absorb a portion of the superabundant gold stock.

The history of the gold certificate illustrates the diffidence with which the problem of note issue has been approached. Created as an incident to the financing of the Civil War, the gold certificate developed into an important component of the currency in the period preceding the creation of the Federal Reserve System. Logically, there was no reason for its existence thereafter, but, like the national bank note, it continued. Finally its retirement from circulation was brought about in connection with another opportunistic revision of the monetary system.

[30] It will be recalled that the gold certificate of the old-sized currency was printed with yellow ink on the reverse side. The smaller-sized notes were printed entirely with green ink because of the expense of the two-color note.

[31] Cf. L. B. Currie, *The Supply and Control of Money in the United States* (Cambridge: Harvard University Press, 1934), pp. 110–14; and Harris, *op. cit.*, pp. 397–407.

[32] The note issue of the recently organized Bank of Canada has a 25 per cent gold coverage.

SOME ASPECTS OF THE DOUBLE-TAXATION PROBLEM

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THE term "double taxation" does not accurately reflect the problem to which it refers. The term "multiple taxation" should be used instead. It happens often that when the former is used it refers to three or even more levies upon the same source of revenue, instead of merely two. For example, many discussions of double taxation with respect to corporations comprehend all the important taxes which corporations pay, including the property, capital stock, income and dividend taxes, licenses, etc. Any number of levies is within the scope of the term "multiple taxation."

There are three fundamental types of multiple taxation. One is that involved in the simultaneous levies which a taxpayer is called upon to pay by the different types of political units of which he is a citizen. The state of Wisconsin, for instance, is divided into counties, again into towns,[1] incorporated villages and cities, and again into school districts. Each of these groups of units, as well as the state, must levy a separate set of taxes upon the citizens for the purpose of raising the revenue it needs in addition to that received from other sources.[2] This form of multiple taxation is an issue only to the extent of the theory being advanced in some quarters that the town form of government has outlived its usefulness.

The other two types of multiple taxation have always been a source of vexatious problems. One type is that which occurs when the same source of revenue is, within a year, levied upon by two or more political units of similar status; e.g., two or more states of the same country or two or more countries. Many industrial and

[1] These correspond to the townships of some of the other states.

[2] The state has not levied a general-property tax since 1930.

commercial concerns do business or have other kinds of economic interests in more than one state or country. For example, a manufacturing concern's plant may be located in one state, its main office may be located in another state, its stock may be owned in another one, and bonds which it may have sold may be owned in still another one. Each of these states feels that it has a right to levy taxes upon the concern. The result may be multiple taxation. The last type of multiple taxation is that involved in two or more simultaneous levies upon the same source of revenue by the same political unit. This article will deal primarily with this last type.

Multiple taxation is really a problem only to the extent that it causes excessive burdens. Of course, the cost of administration of a multiplicity of taxes is greater than that of a small number, but that is scarcely ever an issue when the problem is discussed. The additional cost of administration is merely incidental to a proportionately larger amount of public revenue. Too many people allow themselves to condemn new levies merely because the source of revenue involved is drawn upon by one or more other taxes, even though the aggregate burden thus placed upon it is, in reality, not excessive. In the minds of these people, multiple taxation and excessive taxation are always synonymous.

On the contrary, a single levy upon a person or organization may be excessive as compared to the multiple levies on another person or organization. This is not at all unrealistic. For example, A and B each own a city residential lot. The two lots in a given year are equal in assessed value. Hence, each of the owners paid the same amount of normal real estate tax as the other. If the street adjacent to A's lot was paved the year this tax was levied but that adjoining the other's lot was not, and the special assessment levied upon A on this account was comparatively very low in amount, then even though A was taxed twice and B only once, the former was, relatively, taxed less heavily than the latter. An improvement of this type almost without exception causes a substantial increase in the value of the abutting property.

Again, if farmers were paying no taxes other than the general property tax, they would, as a rule, still be bearing a dispropor-

tionate burden as compared with the residents of the cities and incorporated villages. Dane County, Wisconsin, is one of the good agricultural counties of the North Central States. In 1924, the taxes paid by the farmers of that county absorbed 19 per cent of their net incomes. Only 6.5 per cent of the net incomes of the residents of the cities was required for taxes and the corresponding percentage for the incorporated villages was 5.9. Net income was considered to be that subject to the state income tax plus the exemptions allowed on account of dependents, etc. The taxes include only the annually recurring ones, i.e., the general property and federal and state income taxes, the special assessments on property and the state surtaxes on incomes. Corporation taxes were also omitted. The data involve 4,214 farmers and 1,854 village and exactly 13,000 city income-receivers. Each of these groups is approximately a two-thirds sample. Exclusive of the other one-third, the remainder of the population of approximately 100,000 which the county had that year consisted of dependents. The average tax bill of the farmers was $220. All but $0.50 of this was general-property taxes.[3] Of course, this involves the problem of the shifting of taxes. That is outside of the scope of this article but it is appropriate to point out at this juncture the erroneousness of the theory that all taxes are shifted to, and paid by, the ultimate consumers of the goods produced and services rendered. Some are thus shifted, but others are shifted only to some "middlemen," and still others are actually borne by those upon whom they were originally levied.

In fact, as other writers have shown, multiple taxation of the third type is inevitable. If each individual and organization paid but one tax, it would be impossible to raise sufficient revenue. If, for example, the real estate owners were relieved of all non-property taxes, if the professional people who own no real estate were required to pay only an income tax, etc., the revenue thus lost could not be fully recovered by increasing the amounts of general-

[3] B. H. Hibbard and B. W. Allin, "Tax Burdens Compared," *Wisconsin Agricultural Experiment Station Bulletin*, No. 393 (March, 1927), pp. 6–10. (Professor Hibbard is now making a similar investigation in Dane, Grant, Green, Iowa, Rock, and La Fayette counties in Wisconsin for 1929 and 1933.)

property taxes, income taxes, etc., respectively, which these groups now pay. The general-property tax must, owing to federal and state constitutional requirements, be levied at a uniform rate within each taxing district. Inasmuch as this tax has already been carried beyond the point of diminishing returns in most localities, it could scarcely be made to yield more revenue by raising the rates.

Perhaps something could be done along the line of adjusting the assessed values of the holdings of the real estate owners who would be relieved of non-property taxes, so as to offset this loss in revenue, but the prospects are not inviting. The strenuous efforts which have been made so far to assess items of property in proportion to the ability to pay of their respective owners have been rather unsuccessful. The state of Minnesota is something of an exception. In that state, mining land is assessed at a certain percentage of "true" value, agricultural real estate at another percentage, etc. However, even this policy is only a partial solution of the assessment problem. Inasmuch as the "true" value of each holding must be established before the taxable value can be ascertained, the same original errors in assessment occur in that state as in any other. That state has also found it necessary to levy a multiplicity of taxes, including an income tax. Admittedly, the taxes paid by those who own no real estate can be increased, but obviously the non-property taxes now paid by the real estate owners cannot all be shifted to the other people and organizations. Furthermore, if the owners of the real estate were relieved of all non-property taxes, if the professional group which owns no real estate were required to pay only the income tax, etc., and the revenue thus lost could be recovered, the distribution of the tax burden, which is the basis of the current objections to multiple taxation, would remain virtually unchanged.

However, another object of a multiple system of taxation is to distribute the burden more equitably. Ability to pay has generally been adopted as one of the bases of taxation. Taxes are a periodic expense, and the bulk of the public revenue must—and should—be paid by the citizens out of periodically received income. Each annual tax is based upon an assumption of an annual

income out of which it is to be paid. Hence, ability to pay is measured in terms of current net income,[4] except that the ability of people and organizations who have no net income must be judged upon the basis of the property they own, if any. Benefits derived from governmental services are also recognized as a legitimate basis of taxation. Still another factor which should be considered is the extent to which incomes received are unearned. Ability to pay and benefits derived are seldom synonymous and usually cannot both serve as bases of the same tax. However, the general-property tax, the oldest of the important levies, reflects neither the ability to pay of nor the benefits received by the property-owners, and most of them pay either too much or too little. In fact, this is a regressive tax, owing to the fact that the assessors consistently assess large property holdings proportionately lower than small ones. They are more familiar with the market values of the small holdings than with those of the large ones. Also, the owners of the large properties exert more effort to keep their assessed values down to the minimum than the owners of the small ones do.

Hence, it has been necessary to supplement the general-property tax with more and more levies of other kinds for the purpose of getting more public revenue from the property-owners whose net incomes were not fully reflected in their respective assessed values, as well as for the purpose of trying to obtain proportionate contributions from those who paid no general-property tax, and thus distribute the burden more in accordance with ability to pay and benefits derived. The income and gasoline taxes are illustrations of the newer levies which have been widely accepted, at least in principle, the former being based upon ability to pay and the latter upon benefits derived. The inheritance tax is levied partly because of the additional ability to pay acquired by the heirs and partly because by far the largest part of each inheritance of more than moderate size is unearned. The issue is: Has multiple taxation been carried farther than equity and the need for

[4] The legal definition of "net income" varies somewhat among the states which levy the income tax, and as between the federal income-tax law and those of the states.

public revenue justify, and, if so, which are the taxes that created the situation?

The practice of politicians of opposing proposed tax reforms upon the basis of the theory that multiple taxation and excessive taxation are always synonymous is notorious. However, the same mistake is made by many others. Even recognized tax experts sometimes allow themselves to be unduly influenced by the duplicate character of a tax and pay too little attention to the relative aggregate burden created by it. Professor H. L. Lutz, for example, admits that "the occurrence of double taxation is not in itself necessarily unjust or inequitable, if it is universal in its extent and if the aggregate tax burden which results is not excessive."[5] However, on the same page he says, "The taxation . . . . of the . . . . assets [of a corporation] and the stocks and bonds, are among the more flagrant instances of double taxation. . . . ." Professor Lutz is here comparing corporations with individuals and partnerships. Whether or not corporations and their stockholders would, as a result of such duplicate taxation, be bearing too heavy a burden remains to be seen. Professor Lutz seems to be taking this for granted. The assumption quite obviously is unsound in many specific cases.

Professor E. R. A. Seligman, in a similar way, condemns simultaneous taxation of a corporation and the holders of its securities. He says, "If the tax—whether on income or on property—is general, and applies to all classes of corporations and to other non-corporate investments as well, it is manifestly double taxation to assess the security holder as well as the corporation. The tax on the corporation diminishes his income from the corporate security; an additional tax on the security would involve double taxation of the same income or property."[6] The taxation of dividends is, at the present time, one of the most controversial of the multiple-taxation issues.

The Wisconsin Supreme Court has declared taxation of this type legal, at least as far as income taxes are concerned. Its posi-

[5] *Public Finance* (New York, 1929), p. 309.

[6] *Essays in Taxation* (New York, 1925), p. 108.

tion was developed in two cases. The first one[7] dealt with a triangular problem. The state of Wisconsin levies personal and corporation income taxes and the Paine Lumber Company, Ltd., situated in the city of Oshkosh, paid a state corporation income tax each year from 1918 to 1922 inclusive. The company's stock was owned by, and the dividends which it declared were paid to, the Paine Lumber Company of Maine—a Maine corporation, which, in turn, in the same years, paid dividends to its own stockholders, some of whom lived in Oshkosh. In Wisconsin the annual dividends received from a corporation which has paid an income tax to that state are exempt. The Maine concern had not paid a Wisconsin income tax those years, but its Oshkosh stockholders claimed exemption of their dividends because of the tax paid by the Paine Lumber Company, Ltd. When state income taxes were levied upon them in respect to those dividends, they refused to pay them.

The court said:

> The legal entity of corporations cannot be destroyed to relieve an apparent or real hardship. The Wisconsin and Maine corporations are in law as much separate entities as are A and B.
>
> The effort to trace the funds or profits passing from one corporation to another, and to claim that since such profits have paid one income tax for a certain year they should not pay another, is useless, because an income tax is not levied upon property, funds or profits, but upon the right of an individual or corporation to receive income or profits. The same funds or property may constitute the income or profits of a dozen or more individuals during the same year.

If the Maine corporation had paid a Wisconsin income tax those years, the claims of its stockholders doubtless would have been upheld.

This decision formed the basis for that which grew out of the second case.[8] On January 1, 1926, Mr. Walter O. West, a resident of Wisconsin, owned 1,080 shares of the stock of the Wisconsin Butter and Cheese Company. On January 19 of that year this concern sold its plant and other property to the United Milk Products Company, a Delaware corporation, and proceeded to

[7] *Paine* v. *City of Oshkosh*, 190 Wis. 69, 208 N.W. 790.

[8] *West* v. *Tax Commission*, 207 Wis. 557, 242 N.W. 165.

liquidate. Between February 2 and March 23, Mr. West received for his 1,080 shares $71,250 in cash and 600 shares of the preferred and 600 shares of the common stock of the United Milk Products Company. He died on May 29. In the state income-tax return filed after January 1, 1927, for him for the period from January 1 to May 29, 1926, exemption was claimed for the dividends received in the liquidation process, the specific reason stated being that these dividends were not subject to the income tax. It was claimed, in the first place, that only the annual dividends distributed by a corporation which remains in business were subject to income tax, and, in the second place, since the Wisconsin Butter and Cheese Company had paid a Wisconsin income tax for this period, another one levied on the liquidating dividends constituted double taxation.

The court first showed that, under a 1927 amendment to the statutes, liquidating dividends are subject to the income tax to a certain extent, even though the corporation distributing them was similarly levied upon in the same period. The position which the court took in respect to the type of double taxation involved is expressed in the following quotation. Though the case deals with liquidating dividends, this part of the decision is worded broadly enough so as to comprehend the other kind of dividends also.

> Objection is further made that the law taxing liquidating dividends when distributed by a corporation that has paid taxes upon the profits which the liquidating dividends distribute to the stockholders, amounts to double taxation. We know of no objection to the legislature imposing a tax upon the income of corporations and also a tax upon the dividends received from the corporation by its stockholders. The earnings of the corporation constitute income received by it upon which the constitution authorizes the levy of a tax. The income received by stockholders in the form of dividends also represents income upon which the constitution authorizes the levy of a tax against the stockholder. In law the corporation and the stockholders are separate and distinct entities, and their earnings are plainly separate and distinct subjects of an income tax. The fact that the legislature has exempted dividends received from corporations which have paid an income tax upon their earnings is but a legislative concession. It is no indication that the legislature could not tax such dividends if it saw fit to do so, or that such taxation would constitute double taxation.

The relation of a corporation to its stockholders is clearly manifested in the extent of the dissociation of the function of ownership from that of control in the case of large corporations. By far most of the owners of the stock of the American Telephone and Telegraph Company, for example, have no intention of ever trying to exercise any control whatsoever over the company's policies and business activities. They do not consider themselves in the telephone and telegraph business. They merely made investments quite similar in object to the purchase of a bond or other security which does not represent a share in the title to the property. The number of the stockholders is large. Each such organization is controlled by men who own but a small percentage of the stock. This situation is, of course, due partly to the wide geographical distribution of the many stockholders and the consequent impracticability of getting more than a relatively small number together at each stockholders' meeting. The extent of the dissociation is in proportion to the size of the organization. Hence, the distinction between a corporation and its stockholders has a psychological as well as a legal basis.

The court's argument is, of course, based solely upon legal grounds. Its view is, however, also justifiable upon an economic basis. Each corporation, as a separate entity, bears most of the risk involved in the business. A stockholder risks only the loss of the money which he invested in his stock, holders of bank stock excepted.[9] The dividends are paid to the stockholders directly for incurring this risk and for foregoing the use of their money. Hence, the relation of the stockholders to the corporation, in principle, is the same as that of a wage-earner to his employer, the main difference being that the wage-earner is paid for working

[9] The owners of bank stock have been subject to double liability. However, one of the provisions of the federal deposit insurance law exempts the stock of national banks organized after June 16, 1933, from this liability, and on July 1, 1937, will remove it from the stock of all the other national banks. This law insures up to $5,000 each individual deposit in the national banks and in such state banks as choose to become subject to its provisions. The state of Wisconsin has passed a similar law in respect to its insured state banks. All stock issued by such banks after June 16, 1935, was exempt from double liability from the date of issue, and the stock issued by them prior to that date will become exempt on July 1, 1937.

instead of for turning the use of some of his money over to somebody else. It is inconsistent for stockholders to fail to recognize the identity of the corporation in the sphere of taxation as well as in that of the distribution of risk.

Also important is the relative ability to pay of certain stockholders. This disproves Professor Seligman's inference that duplicate taxation of this type represents excessive burdens. Corporations are already subject to the income tax. Hence, it is necessary to consider here only the ability to pay of the stockholders. Seventeen people living in the village of Chenequa, Wisconsin, an exclusive residential community close to Milwaukee, received tax-exempt dividends of $274,880 in 1934. Their total net income from other sources was less than that, viz., $211,531. The corresponding amounts for the three immediately preceding years were: 1933, $263,739 and $172,157; 1932, $145,733 and $203,652; and 1931, $283,950 and $240,021. Manifestly, these dividends represent relatively large amounts of ability to pay. It is unnecessary to take into account the taxes actually paid by these people during those years because stockholders who received no dividends were also subject to those levies, and there is no appreciable direct correlation between the amounts of these taxes and stock dividends received. A certain percentage of the total amount of the net income of any individual or organization, including dividends, if any, should, of course, be exempt.

However, instances of excessive multiple taxation can be found. Special assessments upon real estate sometimes are too high. Again the sales tax places a disproportionate burden upon those with low or moderate incomes, considering also the other taxes which these people pay. It is claimed in the states which are levying the sales tax that it was made necessary by the impossibility of raising needed revenue in any other way, but doubt is cast upon this claim by the fact that the other states are getting along without it.

STACKELBERG ON MONOPOLISTIC COMPETITION[1]

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THE analysis of problems of monopolistic competition has reached a stage in which any further progress is seriously hampered by the lack of a systematic consolidation of the many divergent theories, which have marked the development of the century-old controversy. More than in any other field of economic theory, the real issue is that of selecting an appropriate set of fundamental assumptions. The validity of the most ingenious argument might be easily endangered by unconscious introduction of unstated premises.

It would be naïve to expect that, in attacking a new problem, the theorist should beforehand present a complete and closed list of assumptions; the selection of most appropriate premises can be obtained only through a long process of trial and error. On the other hand, however, no deductive argument deserves the name of a theory unless it has undergone the strictest possible test of logical consistency. The simplest and most efficient way to perform this test is that of retracing the whole argument on the basis of the final, definitive set of assumptions. In the case of quantitative theory, a mathematical reformulation of it appears to be particularly appropriate.

In *Marktform und Gleichgewicht*, Heinrich von Stackelberg performs the difficult task of strictly deductive reformulation of the theory of monopolistic competition with much skill and elegance. Four of the six chapters of this book are devoted to systematic exposition of the fundamental theory; chapter v gives a critical survey of its development from Cournot up to Mrs. Robinson and Chamberlin; chapter vi deals with questions of market disequilibrium as object of economic policies. The mathematical groundwork of the theoretical discussion is presented separately in a large Appendix. The main lines of the argument are developed here with the help of elementary calculus and are further clarified through a number of numerical examples. Although no mathematical formulas are used in the main part of the text, the strong analytical foundation is discernible throughout the whole book.

[1] *Marktform und Gleichgewicht*. By Heinrich von Stackelberg. Vienna: Julius Springer, 1934. Pp. vi+138. Rm. 9.60.

On the basis of the generally accepted distinction between "free competition," "oligopoly," and "monopoly," Stackelberg indicates the existence of nine types of possible market situations, each characterized by a combination of one type of supply with the same or a different type of demand conditions. The analysis is further extended to problems of interconnected markets. Thus the somewhat strained concept of quality variation is entirely avoided and the equally difficult notion of "similar commodities" is replaced by a clear-cut concept of interrelated demand.

The basis of the whole theory is to be found in the discussion of simple duopoly (the author himself uses the term "dyopoly"). Stackelberg takes with good reason the position that all the other more intricate market situations can be considered as modifications of this fundamental setup: The only significant difference between monopolistic competition in a single market and the rivalry between producers of interrelated commodities is that in the latter case each seller has a choice between a *price* and a *quantity* adjustment policy; while on a single, homogeneous market no price differentiation is possible, and consequently quantity variation represents the only method of monopolistic competition.

Given two sellers competing on the same market, the behavior of each of them may be either based on the assumption: (1) that his own behavior does not influence that of the other; or, on the contrary, (2) that in response to every move on his own part, his rival will systematically undertake a new adjustment. Should, however, seller A assume that B acts independently, the profit motive will necessarily induce him to direct his own output according to the variation of B's production, i.e., to accept the rôle of a *follower*. Should A believe, on the other hand, that B behaves like a follower himself, A would necessarily take the rôle of a *leader* and determine his own best optimum position, disregarding the momentary output of B, but taking into account that every move which he himself might make will produce a definite reaction on the part of B. Stackelberg distinguishes thus three possible situations: (1) each of the two competitors might assume that the other is going to behave like a leader and consequently act himself as follower; or, on the contrary, (2) each will expect the other to take the attitude of a follower, and both will actually behave as leaders; or finally, (3) one of them will act as a follower, expecting the other to be the leader, which this other will actually do on the (correct) assumption that the first is ready to follow. The first case leads to the solution

of the duopoly problem which was envisaged by Cournot (also Amoroso and Schneider), while the second indicates another type of solution—that of Bowley. Stackelberg shows that neither of these two "symmetrical" setups can result in a stable equilibrium, because in both of them the behavior of each of the two competitors is different from that which the other expects. Only in the last "asymmetrical" case does the behavior of A really correspond to the expectations of B, and vice versa.

Which of the three possible setups will actually emerge in any particular case depends upon the empirically given shapes of the cost and (total) demand curves. Should the position of a leader appear to be more profitable, each one will try to bluff the other into a follower position. Less probable, but still possible, is the opposite situation, where both are striving to gain the position of follower and induce each other to take the lead. Finally, even more rare would be a case in which the one would prefer the leadership while the other would find the position of a follower to be more advantageous. A convenient graphic method for the analysis of the different duopolistic situations is developed by Stackelberg through the use of profit-indifference lines.

Discussing the general scheme of possible duopolistic equilibriums, Stackelberg seemingly has overlooked one, not very probable, but nevertheless theoretically significant, situation. His assertion that Bowley's setup, in which both competitors try to obtain the leadership, cannot possibly produce a stable equilibrium, is explained by the fact that neither of the two will actually behave according to the expectations of the other. This is necessarily true if we supposed that each of the two would expect the other to be a simple follower, this latter attitude being defined as a belief that the other seller is going to behave quite independently. It is indeed obvious that in such circumstances the actual experience will very soon show at least one of them that he has misjudged the attitude of his competitor. One can, however, easily think of a case in which each of the two sellers expects a definite adjustment policy on the part of the other, chooses the rôle of the leader, and finds that the behavior of his competitor actually corresponds to his expectations.

Let $p=F(q_1+q_2)$ be the general market demand function, p indicating the price, q_1 and q_2 the output of the two monopolistic competitors. If $c_1=f_1(q_1)$ and $c_2=f_2(q_1)$ are their respective total cost functions,

both will try to attain the maximum points in which the marginal *net* revenues are equal to zero.

$$(1a)\qquad \frac{d}{dq_1}(pq_1-c_1)=0 \qquad \text{and} \qquad (1b)\quad \frac{d}{dq_2}(pq_1-c_2)=0\,.$$

Each of the two acts according to certain quantitative evaluations of the other's reactions. Solving his own maximum problem, the first seller attaches accordingly a definite value u_1 to the derivative dq_2/dq_1, which describes the expected reaction of the second; while this latter introduces in his own equation a value u_2, which expresses his subjective evaluation of the derivative dq_1/dq_2, i.e., the reaction of the first one.[2] The solution of equation (1*a*) gives a new function,

$$(2a)\qquad q_1=\varphi_1(q_2)\,,$$

which describes the actual behavior of the first producer as based on his evaluation u_1 of dq_2/dq_1. Analogously, function

$$(2b)\qquad q_2=\varphi_2(q_1)\,,$$

derived from (1*b*), shows the actual behavior of the second seller as based on his evaluation u_2 of the coefficient dq_1/dq_2.

Stackelberg shows that in cases of symmetrical setups, the expected values u_1 and u_2 will often differ from the *actual* coefficients $\varphi_2'(q_1)$ and $\varphi_1'(q_2)$, as obtained from (2*a*) and (2*b*); and he points out that stable equilibrium is incompatible with such discrepancy. He entirely ignores, however, the possibility of correct anticipation under symmetrical conditions. To define such a stable symmetrical setup, it is sufficient to complement equations (1*a*) and (1*b*) by the two stability conditions:

$$(3a)\qquad \varphi_2'(q_1)=u_1 \qquad \text{and} \qquad (3b)\quad \varphi_1'(q_2)=u_2\,.$$

The four equations (1*a*), (1*b*), (3*a*), and (3*b*), taken together, define a whole class of stable equilibriums of the symmetrical (Bowley's) type.

[2] In general u_1 and u_2 could be considered to be a function of q_1 and q_2. We simplify the present discussion by considering only the special case in which u_1 and u_2 are constant.

The general analytical definition of stable symmetrical equilibriums given above can be illustrated by a numerical example:

Given a linear demand function

$$p=6-Q, \qquad \text{where} \qquad Q=q_1+q_2,$$

and two identical non-linear cost functions,

$$c_1=1+\tfrac{1}{4}q_1^2 \qquad \text{and} \qquad c_2=1+\tfrac{1}{4}q_2^2,$$

we obtain two identical maximum equations:

(I*a*) $$\frac{d}{dq_1}(pq_1-c_1)=-q_1(\tfrac{5}{2}+u_1)-q_2+6=0,$$

(I*b*) $$\frac{d}{dq_2}(pq_2-c_2)=-q_2(\tfrac{5}{2}+u_2)-q_1+6=0.$$

If these are to be true maxima, the following two inequalities must also be verified:

(II*a*) $$\frac{d^2}{dq_1dq_1}(pq_1-c_1)=-2(\tfrac{5}{4}+u_1)<0,$$

(II*b*) $$\frac{d^2}{dq_2dq_2}(pq_2-c_2)=-2(\tfrac{5}{4}+u_2)<0.$$

The two stability conditions derived from (I*a*) and (I*b*) according to (3*a*) and (3*b*) are:

(III*a*) $$-\frac{2}{5+2u_2}=u_1,$$

(III*b*) $$-\frac{2}{5+2u_1}=u_2.$$

The solution of a system of the four equations, (I*a*), (I*b*), (III*a*), and (III*b*) is somewhat intricate. It suffices, however, for our purposes to indicate one set of values which will satisfy them:

$$u_1=u_2=-\tfrac{1}{2}, \quad q_1=q_2=2, \quad \text{and accordingly,} \quad Q=4, \quad p=6.$$

This solution indicates that if each of the two competitors happens to think that the reaction of the other one corresponds to u_1 (or u_2) $=-\frac{1}{2}$,

respectively, while each of them sells at the same time two units of the commodity, neither will have any reason to alter his expectations and revise his calculations, and thus to disturb the existing equilibrium.

One of the most important points raised by Stackelberg in the "historical" chapter is his discussion of "individual" demand curves. It is difficult to disagree with the author's opinion that, if uncritically applied in the analysis of imperfect competition, this concept simulates a solution of the problem beclouding the real issue. As soon as the existence of such individual demand curves is postulated, the necessity of a simple equilibrium solution becomes a foregone conclusion. A real theory of imperfect competition must prove, or disprove, the validity of this postulate rather than introduce it as an assumption.

The basic idea of the last chapter of the book is the notion of "conventional equilibrium" and of "conventional price." Such a price is established by intervention of an independent power (the state authority, for example) and has to be considered by the sellers, as well as by the buyers, as an *independent* variable. Its height is determined so as to equate the total supply and the total demand.

An English translation of Stackelberg's excellent book would be highly desirable.

BOOK REVIEWS

The Theory of Economic Development. By JOSEPH A. SCHUMPETER. Translated from the German by REDVERS OPIE. Cambridge: Harvard University Press, 1934. Pp. xii+255. $3.50.

The *Theorie der wirtschaftlichen Entwicklung*, first published in 1911, was revised and published in a second edition in 1926. The English version, here under review, is, with slight alterations, a translation of the second German edition.

The author explains in the Preface that he still regards the main outline of the book as essentially correct, though there are many points upon which he now has a different opinion. The book, however, has had a history and "life," so to speak, of its own, and it is quite easy to see how this would disincline the author to alter it substantially. The author, however, is about to publish what he calls a more "realistic" study of money, interest, and cycles.

The book is by no means out of date and retains a vigor and freshness which makes this translation a welcome addition to English economic literature. Nowhere else does one find so penetrating a treatment as here of the significant characteristics of the process of development, of economic dynamics, in contrast with the "circular flow" of an essentially static society.

In the "circular flow" the process of production is continuous. From this process flows both a stream of goods, continually being renewed, and also a stream of money income which takes these goods off the market. The problems relating to the operation of this process, once it has been developed and set going, are very different from those of development. In the circular flow the process of production is merely being maintained, while in a dynamic society development is going on. Development is something quite distinct and foreign to the circular flow. It is spontaneous and discontinuous change in the channels of the circular flow. These changes are technical innovations in the production process. Development means the carrying out of new combinations in a different employment of existing productive resources.

One must distinguish the process of creating a productive apparatus from the process of operating it when once it is created. It is a mistake,

in the author's view, to assume that one can explain many of the phenomena of the highly dynamic modern order by centering attention alone on the essentially static processes of the circular flow. This is notably true of the problems of interest, profits, and business fluctuations. "Productive" interest, in Schumpeter's view, could not exist in the circular flow, but results from the process of development. The necessity of "waiting" does not recur every time a process of production is repeated. "Whatever may be the nature of waiting, it is certainly not an element of the economic process which we are here considering because the circular flow, once established, leaves no gaps between outlay or productive effort and the satisfaction of wants" (p. 38).

This does not mean, however, as has sometimes been wrongly believed, that Schumpeter denies the existence of interest in a society in which there is no development. In the circular flow, in which there is no development, interest would still exist in the case of consumptive loans, owing to the time preference incident to the pressure of current needs or to the expectation of a future increase in income. What the author denies is that these constitute the really important phenomenon which needs explaining, namely, the interest on productive loans. Productive interest has its source in profits which are incidental to the successful carrying out of new combinations, to the process of development. A static economy knows no productive interest.

Schumpeter does, indeed, reject one of the famous three reasons which Böhm Bawerk assigned for the premium on present purchasing power, namely, the discounting of future enjoyments. So far as the third reason—the roundabout method of production—is concerned, he holds that Böhm Bawerk should have kept strictly to the expression "adoption" of roundabout methods, for it is in his view the act of innovation which is a genuinely entrepreneurial act, and which accounts mainly for interest.

It is industrial development which is the chief source of profits and of productive interest. Did development cease, this, the really significant element in current interest, would disappear, and there would remain only interest on consumptive loans. Such interest would arise, in the author's view, from the pressure of present wants in comparison with less pressing future wants or from the low level of present income in relation to expected future income. But with production interest eliminated, the ruling rate on consumptive loans in a static society

would probably be very low, and thus interest would play an insignificant rôle as compared to that which it plays in a dynamic society.

Schumpeter elaborates the significant rôle of credit in the process of development. Thus he was one of the first to elucidate the effect of credit expansion upon the distribution of income and upon capital formation—in short, the rôle played by "forced saving."

The mere mention of the term "forced saving" is enough to indicate that an English edition of this book (now twenty-five years old) is not out of date. And just now, when so much interest has been evidenced in "neutral" money and in "100 per cent reserve plans," Schumpeter's volume is of special significance. Not only does it emphasize the importance of innovations and technology in economic progress in contrast to the semi-mechanical monetary factors, but it also stresses the great rôle played by credit in economic development. It suggests that while "neutral" money might indeed prove the appropriate monetary arrangement in the "circular flow," such a monetary system is not sufficiently flexible in a dynamic society in which development is going on. For bank credit has always played an important rôle in detaching the needed productive resources from their established places in the circular flow to the new combinations. Innovations have time and again been facilitated and made possible by the expansion of bank credit. Credit bridges the gap between products and means of production in carrying out new combinations.

All this raises the question whether modern capitalism could survive as a system of free enterprise if development, innovations, and the expansive activity which characterizes the boom were vigorously suppressed by an inflexible money policy. The boom, facilitated by bank-credit expansion, gives the private-enterprise system a measure of elasticity in a price structure which tends, under modern conditions, more and more to become ossified and rigid. Capitalism cannot live without economic progress, without growth, development, expansion.[1]

Schumpeter finds the essence of the boom to consist of the process of introducing innovations into the system of production. But the incorporation of those new methods into the circular flow cannot be accomplished without bringing in its train a period of readjustment. This process of absorption is, in the author's view, the essence of depression. Both the profits of the boom and the losses of the depression are essen-

[1] See my article, "Recent Trends in Business Cycle Thinking," *Review of Economic Statistics*, May, 1936.

tial functions without which the process of development would be seriously hampered.

These brief reflections are, of course, wholly inadequate to indicate the scope or content of this important book. They may, however, serve to show how vitally it bears on current economic problems. What is quite impossible to convey is the vivid imagination with which the "vision" is conceived, and the dramatic marshaling of ideas which give the book a quality all its own.

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Codes, Cartels, National Planning. By BRUNO BURN, in collaboration with S. FLINK. New York: McGraw-Hill Book Co., Inc., 1934. Pp. x+413. $4.00.

Cartel Problems. By KARL PRIBRAM. Washington: Brookings Institution, 1935. Pp. 282. $2.50.

The modification of public economic policy inaugurated by the Roosevelt Administration in 1933, whether viewed from the standpoint of its embodiment in the N.I.R.A. or from the broader standpoint of the general relationship of the government to the economic process and economic interests generally, may be justly characterized as radical. But this is true in one sense only. It represented a departure from established tradition. It is quite untrue as a description of the direction of that departure. The abandonment of the trust in "free" competition as signaled by the suspension of the anti-trust laws (but equally implicit in the banking legislation, the A.A.A., the housing program and numerous relief measures) did not mean a revolutionary realignment of economic interests. It signified in substance simply a blind and confused endeavor to fortify vested interests—in a word, to preserve by means more effective than those which in practice had proved inadequate the established privileges and prerogatives of a business régime.

The two books under review evince a clear realization of the significance of the New Deal economic policies in the sense in which they *are* radical. But no awareness is shown of the significance of the changes wrought in the sense in which they are *not* radical. This comes down very nearly to stating, and it might almost be stated, that the authors are quite oblivious of the real nature and the vital shortcomings of the N.R.A. program, or of industrial cartelization generally, which is the main subject of their discussion. The exposition and the criticism alike

contemplate "industrial co-operation" simply upon the plane of its relationship to the achievement of "business stabilization."

This does not mean that the books are of equal merit. Though both authors are intimately familiar with German industrial development and practice, Dr. Pribram's experience has been chiefly that of a student of the cartel movement, while Dr. Burn's has been that of an active participant therein. These circumstances are reflected in their respective approaches to, and analyses of, the American experience with codes and of cartel prospects. Dr. Burn is imbued with a missionary's zeal for "carrying the light into dark places." His book is chuck full of good advice for the business men upon how to make "self-government in industry" effective—and profitable. Voluntary cartels are "the next stage" in industrial development, and national planning —by syndicated business men—the ultimate goal. This heaven of profit-security is, indeed, so near at hand that on the final page the author modestly offers a scroll of fifteen theses, his own Revelations, to be preserved for all eternity "in the cornerstone of this temple." Concerning such a book, it would be mere cavil to complain of absence of documentation, of stark contradiction, of wearisome reiteration, and of specious argument.

Dr. Pribram lacks the evangelical fire of his Teutonic brother. Indeed, on its face *Cartel Problems* is a model of scientific objectivity. But there are issues in reference to which the studied display of impartial, all-around skepticism may be carried to the length of exhibiting an underlying bias. This is one. Though Dr. Pribram's scrupulous balancing of pros and cons (e.g., chap. iv) and his cautious avoidance of forthright judgment (e.g., pp. 19–20, 114–19, 135, 148–50, 161, 186–87, 198–200) scarcely conceal a lingering faith in the economic justification of cartels (e.g., pp. 97, 116), nevertheless this manner of exposition does at least afford the reader an opportunity to form his own conclusions, availing himself of the aid of a reasonably wide perspective. Moreover, there are occasional flashes of economic insight which help materially in revealing the essential economic significance of cartels (e.g., pp. 40, 64, 233).

On the whole, Dr. Pribram's contribution to the analysis and appraisal of cartel tendencies and policies, with its incidental reference to our limited similar experience under the N.R.A. codes, represents a respectable piece of work. It is handicapped, however, by a Teutonic penchant for taxonomic exercises (cf. chaps. ii and vi), by a fumbling treatment of theoretical issues (cf., discussion of cartel price policy, pp.

76–85 and 138), and most heavily perhaps by a myopic preoccupation with the endemic instability of capitalism. The most skilled therapeutic art avails little, it is said, in default of accurate diagnosis. If this be so, the economic clinician who proceeds upon the unexamined hypothesis that capitalism suffers from a fatal malady (tendency to overexpansion or overproduction) might do well to ask himself whether such "cures" as seem appropriate, either self-administered or applied by compulsion, may not be worse than the disease. He might do even better, indeed, by asking himself whether the supposed sufferer may not after all be the disease itself—and society the host.

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The Rôle of Money. By FREDERICK SODDY. New York: Harcourt, Brace & Co., Inc., 1935. Pp. x+214. $2.00.

Money. By R. C. MILLS and E. RONALD WALKER. Sydney: Angus and Robertson, Ltd., 1935. Pp. ix+219. 5s.

Money and the Economic System. By E. M. BERNSTEIN. Chapel Hill: University of North Carolina Press, 1935. Pp. xi+516. $3.00.

These three books are inspired by a common desire "to clear up the mystery of money" (Soddy) for "students and readers generally who have not previously undertaken any serious study of the subject" (Mills-Walker)—in other words, for those whose knowledge of the subject is so elementary that they may even be expected to make use of the "glossary" of technical terms which one of the authors (Bernstein) provides. Here, however, the resemblance ends.

The case of Professor Soddy is no less pathetic because it is a common one. A distinguished scientist, Nobel laureate in chemistry, becomes convinced of two things: first, of the glories of the achievements of contemporary natural science (pp. 3, 6, 12, 33, etc.); and second, of the utter worthlessness of the "conventions and half-truths that pass for economics" (pp. 4 f.). Hence this further attempt by Professor Soddy to show what is possible when "scientific men—mainly engineers and physical scientists" devote "the same searching and original thought that they were accustomed to apply in their own inquiries" (p. 20) to the clarification of the subject which the "blunders" of the "ordinary conventional economist" (p. 41) have done so much to muddle.

The truth of the matter is that Professor Soddy, when he writes on

money, is a crank, pure and simple. Like all cranks, he is vaguely aware that "a scientific investigator or pioneer into novel regions of thought" like himself may be thought "mad" (p. 198). To this the answer can only be: not mad, merely silly—and, above all, ignorant. There is scarcely a page which does not testify to the author's complete innocence of any real knowledge of the actual content of the "orthodox economics" which he criticizes so readily and so violently (pp. 6, 8, 11, 31, 65, etc.). It was hardly necessary to drive the point home by appending a Bibliography in which, along with abundant references to the writings of monetary cranks and journalists, there is a single reference to "the frankest orthodox book on money": "What Everybody Wants to Know about Money," by G. D. H. Cole and others.

The other two volumes have a much less "revolutionary" purpose than that advanced by Professor Soddy. Their purpose, in the words of Messrs. Mills and Walker (p. v) is the "restatement, in elementary terms, of modern monetary theory." On the whole, the two Australian writers have done extremely well within the limits they have set themselves. If, here and there, one feels the absence of the firmness of touch which characterizes most of the performance, the shortcoming is to be charged less against the authors than against the present state of certain branches of that "modern monetary theory" which they are attempting to "restate in elementary terms." This is true, for example, of the current treatment of the "natural rate" (cf. pp. 90 f., 166), which is involved in a state of confusion that is no less deplorable because so many who refer to the concept are unaware that any serious confusion exists. It is true also of that blessed dichotomy, "Savings and Investment" (cf. pp. 83 ff., 166, 173 ff.), which some of us will continue to avoid as if it were the plague until it is shown to involve something more than the tying up in loose and treacherous bundles of a mass of packages which are capable of much better handling if they are wrapped separately and more tightly.

It is to be feared that the general plan and organization of Bernstein's book raises hopes which are not realized by the substance of the book itself. The reader will be able to judge the consistency and balance of the author's treatment of questions of monetary policy by comparing his remarks on the gold standard and "monetary management" (pp. v f., 61 ff., 143, 321, 483, etc.) with, say, Messrs. Mills and Walker's treatment of the same issues (pp. 128 ff., 169 ff.); and he will be able to test the quality of the author's handling of analytical tech-

niques by comparing his section on "Saving and Investment" (pp. 252 ff.)—in which, rather characteristically, the moribund equations of Keynes's *Treatise* are paraded—with the section on the same subject by Mills and Walker, despite the fact that the latter is not without its shortcomings. Since, moreover, the author has chosen to refer freely to a few islands in monetary literature, it may be pointed out that one is not reassured as to the extent of the author's familiarity with that literature upon discovering that he believes that the "quantity theory" was "first expressed algebraically by Simon Newcomb" (p. 201) and discusses the "algebraic form" of the "cash-balance equation" in terms which would suggest that the priority belongs to Professor Pigou (pp. 227, 241).

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American Bank Failures. By C. D. BREMER. New York: Columbia University Press, 1935. Pp. 144. $2.25.

The record of failures among American banks is well known, at least in a general way, to all those students of banking who are familiar with the contents of the annual reports of the various governmental agencies supervising banking activities. In this small volume, however, Dr. Bremer has brought together much of the significant material contained in these annual reports and has organized it in a painstaking and thoughtful manner.

About one-half of the book is devoted to an analysis of the statistical record of failures of both national and state banks for the period from 1865 to 1934. A particularly good job is done in straightening out the tangled record of just what happened to the non-licensed banks in 1933. One might criticize as excessive the amount of space in a volume as small as this which is devoted to the detailed results to creditors in the liquidation of all national and state banks. The chapter on the "Guaranty of Deposits" is somewhat superficial in character and adds little to the value of the study as a whole.

So far as this reviewer is concerned, the real heart of the book lies in the discussion of responsibility for failures and of the operations of commercial banks in the security markets. Here the author refuses to be sidetracked into giving undue weight to symptoms or irrelevant matters. He realizes that the lack of unified governmental control and restrictions on the extension of branch banking are the really fundamental causes of excessive bank mortality. The Federal Reserve auth-

orities, in hearings before a House committee in 1928, listed the following as leading causes of failures for the period 1921–27: doubtful, slow, or past-due paper; heavy withdrawals; depreciation of securities; poor management; loans to officers and directors; defalcations; loans to enterprises in which officers or directors were interested; failure of banking correspondents and of other large debtors. With the possible exceptions of defalcations and failures of banking correspondents, failures due to such causes are, of course, merely failures which should properly be ascribed to bad management. Dr. Bremer recognizes that at least some of these so-called "causes" are merely details under the general heading of "incompetent management."

R. G. RODKEY

University of Michigan

The Sociology of Invention. By S. C. GILFILLAN. Chicago: Follett Publishing Co., 1935. Pp. xiii+185. $2.00.

Inventing the Ship. By S. C. GILFILLAN. Chicago: Follett Publishing Co., 1935. Pp. xvi+294. $2.50.

The Sociology of Invention is concerned with technical, as distinguished from scientific and "moral," invention. That is the meaning likewise attached to the word in the present review. In the author's opinion, serious studies of the social aspects of invention have suffered from the fact that they have been turned out either by "inventors, engineers, physical scientists or patent lawyers," or by social scientists without adequate technical knowledge. In addition to being a trained sociologist who has dedicated himself to the field of invention for a period of more than two decades, Dr. Gilfillan is also something of an inventor and engineer. While the way has in part been prepared for it by "intelligent but inconclusive, discordant writings," the present volume purports to be the first one deserving of the title "The Sociology of Invention."

It consists of an elaboration of the thirty-eight "Social Principles of Invention" enumerated at the outset of the volume. These principles have for their factual premises data derived from histories of various inventions, from statistical studies, and from the intensive examination of the development of the merchant ship. He refers to the last as the application of the case method. It is exemplified in the companion volume, *Inventing the Ship*. The limitations to which each of these sources or methods is subject are not so great with respect to the case-study

method as with the other two. The author therefore leans most heavily upon it in his effort to demonstrate the validity and illustrate the meaning of his principles. Thirty of the thirty-eight principles "will be found clearly illustrated in the ship's history."

"The Social Principles" are roughly divisible into those relating to (1) the nature of invention, (2) the conditions favoring or retarding invention, and (3) the effects of invention. His conception of the nature of invention conforms to "an axiom of social science that social changes never come about with absolute suddenness" (*Sociology*, p. 34). He denies that history has ever witnessed the emergence of a revolutionary invention as distinguished from the "perpetual accretion of little details." Because of the "principles" of duplicate invention and functionally equivalent invention, a particular invention can be no more revolutionary in its effect than in the character of its emergence. Inventions are the products of "social forces," and they appear when the time is ripe for them. Individual inventors are merely the vehicles of these social forces, and the absence of any one of them would have made little difference with respect to the practical consummation of any line of technical development. It should be noted that the foregoing relates to the nature and rôle of the individual invention. In so far as the author is concerned with the rôle of invention in historical development, he conceives that there has been a tendency to exaggerate the importance of the technical factor (*Sociology*, pp. 132 ff., 148).

The author's sophistication with respect to the uses of language, e.g., "The definition makes the invention" (*Sociology*, p. 140), lends a redeeming tentativeness to what would be otherwise a dogmatically evolutionary interpretation. Few social scientists possessed of a broadly theoretical orientation toward their respective sciences can afford to miss the wealth of suggestion contained in Dr. Gilfillan's *The Sociology of Invention*.

LEO ROGIN

University of California

Economics of Transportation. By D. PHILIP LOCKLIN. Chicago: Business Publications, Inc., 1935. Pp. xii+788. $4.00.

This text is designed to provide the material necessary for a beginning course in principles of transportation, on the assumption that detailed problems of operation and management are treated in more specialized works. The author definitely limits the scope of his work by confining it to transportation in the United States, and by excluding

reference to passenger transportation. Though partially violating the promise of the title, these eliminations serve to keep the size of the book within workable limits.

First, to deal with features which the reviewer considers unfavorable. There is a heavy overemphasis on regulation. Twenty-two of the thirty-five chapters deal in whole or in part with regulation history, principles, or practice. Granting that the discussion of transportation can hardly avoid frequent reference to the question of regulation, because of the degree to which almost every phase of transportation is affected by public control, the reviewer cannot avoid the impression that the particular interest of the author in regulation has led him to stress this aspect of his subject too much, with a resulting neglect of the principles and problems concerning the actual movement of goods and persons. The three chapters devoted to valuation and fair return, in particular, illustrate this lack of balance. (The author, in the Preface, indicates his reasons for including these chapters.) Also overemphasized is the material on railway economics; only five of the thirty-five chapters deal with other agencies of transport, and the discussion of rate making in particular practically ignores the problems of pricing of service in these other agencies.

The reviewer would like to find: a better introductory section on the scope and significance of the transportation industry as a means of orienting the subject of transportation for the student; greater emphasis on the geographical layout of the transport agencies; a more adequate description of the actual process of pricing by the carriers, particularly the water and highway carriers; some discussion of the relations between the transportation agencies and labor; and some attention given to guidance in the use of the abundant statistical material available to the student of transportation. The chapter on railway finance assumes the reader's knowledge of corporation finance, and the chapter on railway accounts fails adequately to interpret the meaning of the items on railway statements and the usefulness of railway financial data.

The reviewer also feels that the treatment of rate-making practice should follow, rather than precede, that of rate regulation, since practice is so greatly influenced by, and can hardly be interpreted without, an appreciation of the scope and influence of regulation.

There are, however, enough favorable features to leave the reader with a distinct feeling of satisfaction. The book is not too long for a beginning one-semester or quarter course. Its emphasis on principles

rather than on description and illustration helps to keep its size within bounds and to facilitate the orderly treatment of the subject. The historical material is not overdone. (It is a relief to find only one chapter on railway history proper.) The chapters on freight rates and prices and on freight rates and the location of industry are particularly good. The difficult subject of rate theory is admirably handled for the beginning student. The practice of interpreting the references at the end of each chapter, rather than merely providing a list, is very commendable.

The book is well written, scholarly, well documented. It fills a need for a beginning text emphasizing principles, rather than the practice, of transportation.

HERBERT E. DOUGALL

Northwestern University

Marketing of Manufactured Goods. By NEWEL HOWLAND COMISH. Boston: Stratford Co., 1935. Pp. iii+282. $3.00.

This is "another" of the typical American textbooks on marketing, distinguished from its competitors more by the moderateness of its size than by any other merit. It avoids the pretention of making any contribution in the scientific sense, and presents itself frankly as a "basis of courses" in commerce schools and as a "handbook for manufacturers." In the first respect, the standards are those of introductory or undergraduate courses rather than of an advanced type, but emphasizing the point of view of the manufacturer. This is disturbing, however, to the extent that it may be responsible for dodging a number of problems, such as those of trade finance, which are barely touched on. The second aim is somewhat in conflict with the first—the compactness and often elementary character of the book, which substantially raise its value as an introductory text, exclude detailed discussions relevant to the practical problems of the manufacturer.

The Anglo-American literature in the field tends to neglect *inter alia* two major aspects of marketing: the trends of development in its organization, closely interconnected with other aspects of economic evolution; and the dependence of the marketing structure upon such factors as the technological character of the individual commodity, and the practice of financial interrelations. This criticism holds also against the present book. Professor Comish, however, has brought out a few points often neglected in the literature. His discussion of such very interesting forms of combined manufacturing and marketing

functions as the merchant-converter and the cutters-up, both in the field of cotton fabrics, is the more useful since the subject is scarcely even mentioned in leading textbooks (e.g., in Beckman's *Wholesaling*). The distinction between "standard" and "convenience" articles (p. 81), according to the consumer's attitude, may be worth further thought. On the whole, the value of the book rests on its survey of the comparative merits, from the manufacturer's angle, of the different channels of wholesaling and retailing. The somewhat ambitious discussion of the price problems involved (pp. 184–232) starts out from the economist's theoretical pattern, using Professor Taussig's formulations, but fails to correlate them in a satisfactory way with either the description of actual price-making practices or with the advocacy of public policies.

MELCHIOR PALYI

University of Chicago

British Imperial Preference in Relation to Australia. By VINCENT F. CLEARY. Washington: Catholic University of America, 1934. Pp. viii+90.

This Doctor's thesis presents in 81 pages the cream of the material contained in the bibliography of 8 pages. It makes no contribution to the technique of the study of differential tariffs, and the author appears to have made no independent detailed study of the source material—not even to bring up to date data and tables taken *en bloc* from sources several years old. It forms merely a readable summary of the subject well arranged and well proportioned.

Dr. Cleary finds that the costs of imperial preference in the United Kingdom and in Australia are greater than the benefits to be derived (p. 78), but two pages later he expresses his personal political view that Australia should maintain the preferential system but should not carry it further than at present, and should recalculate the costs of the preference frequently:

> Imperial preference has meant a cost to Australia, that is, a cost in addition to the costs of the general tariff. The cost, too, to Australia has been greater than the cost to the United Kingdom. But the cost has not been excessive. As a compensation for the extra costs involved, Australia has enjoyed invisible preferences from the United Kingdom.

He has earlier quoted some rough estimates of the costs of the preferences; but as he does not critically examine the estimates, or attempt

to evaluate the "invisible preferences," or define his measure of "excessive" costs, his "conclusions" are evidently political and sentimental rather than economic and logical.

B. B. WALLACE

Washington, D.C.

Les origines du capitalisme en Angleterre. By JEAN-YVES LE BRANCHU. Paris: Librairie du Recueil Sirey, 1935. Pp. 95.

This little volume of ninety-five small pages reads like a good term-paper by a graduate student. It is based solely on examination of the works of Lipson, Tawney, Power, Unwin, Gray, Nef, etc., or on printed collections of economic documents; but there are important omissions, such as the volumes by Salzmann and Kramer. The book may be useful in introducing French students to some recent English writings, but has little value to English-speaking classes. Its thesis is that until the second half of the fourteenth century England was "essentiellement féodale et pré-capitaliste"; but in this pre-capitalistic economy there already existed "elements of evolution" whose growth was soon hastened by a series of accidental unforeseen factors. Of the latter the "facteur primaire" was the Black Death; others were printing, exploration, the Reformation, and an increased supply of precious metal. Changes in the guilds, in foreign trade, agriculture, and industry are briefly surveyed, and the conclusion is reached that in England industrial capitalism preceded and conditioned commercial capitalism. The evidence in support of this view is very scanty; the emphasis on the effect of the Black Death is questionable; and, more important still, any attempt to fix "les origines" in any particular period is dangerous. The more we unearth concerning medieval economic life, the further back do the origins of capitalism recede.

HERBERT HEATON

University of Minnesota

French Import Quotas. By F. A. HAIGHT. "Studies in Economics and Commerce, London School of Economics and Political Science," No. 6. London: P. S. King & Son, Ltd., 1935. Pp. xi+131. 7*s.* 6*d.*

Mr. Haight's book on French import quotas is a significant contribution to the literature on recent developments in French commercial policy. After giving a brief survey of French commercial policies from 1860 to the present time, the author sets forth in great detail the de-

velopment of the French quota system from the summer of 1931. He gives impartially the pros and cons, the criticisms of its shortcomings and injuries, and the justifications as an economic weapon of defense in the struggle of France to combat the effects of the world-wide depression from 1930 on.

His section on the economic repercussions of the quota system is particularly interesting in relation to prices, not only in France, as a country representative of the gold bloc, but also in the United Kingdom and in the United States, each of the latter having sought relief in currency depreciation, although utilizing different methods. Mr. Haight maintains that the import quotas, which were designed to protect French industry from the deflationary influence of falling prices abroad, have failed in this purpose. Most countries are achieving economic recovery on the basis of a lower price and income structure; and if France is to restore international equilibrium without destroying the franc, prices must be reduced correspondingly.

It is to be regretted that Mr. Haight's book appeared too soon to cover the events of the last few months of 1935, when the situation changed quite rapidly. In the concluding sections he is strongly of the opinion that the quota system is firmly intrenched as a permanently integral part of French commercial policy. Recently, the French government has returned to a policy of tariff rather than quota protection. At first it was intended to make this substitution rapidly. Obviously, however, in any such hurried action mistakes might easily occur, whereby French industries would not be offered adequate protection and would be irremediably injured. The special committee under the direction of M. Rist is now conducting its studies over the entire field of items at present under the quota system, with the purpose of substituting tariff for quota protection and at the same time permitting the normal flow of foreign trade.

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